ELECTRICAL TIMES

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The best jobs are done with BICC Cables.

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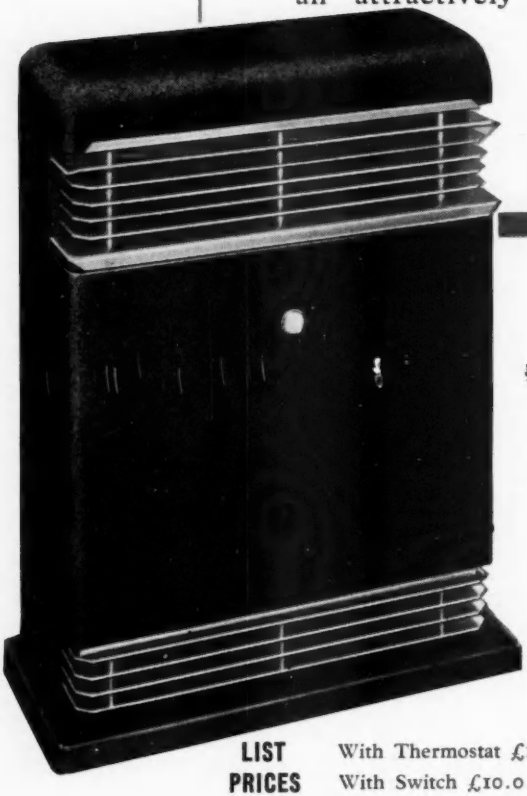

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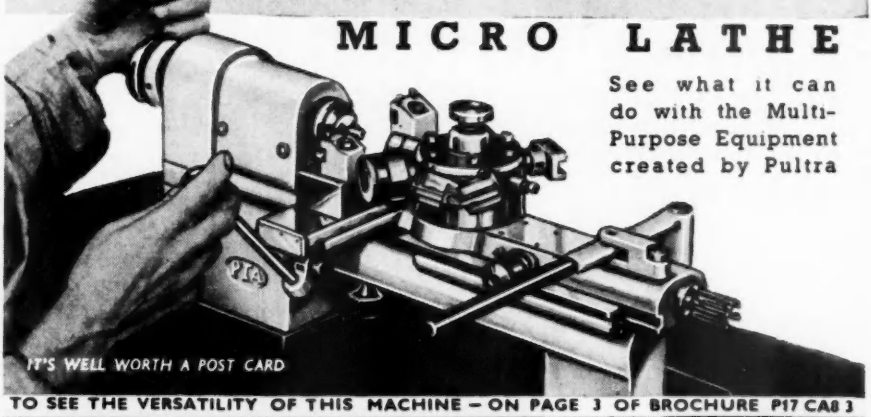

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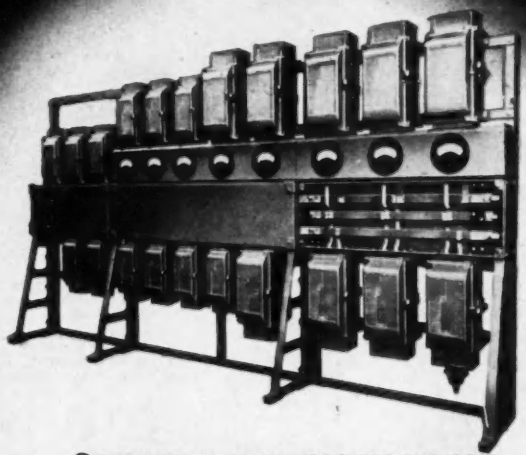

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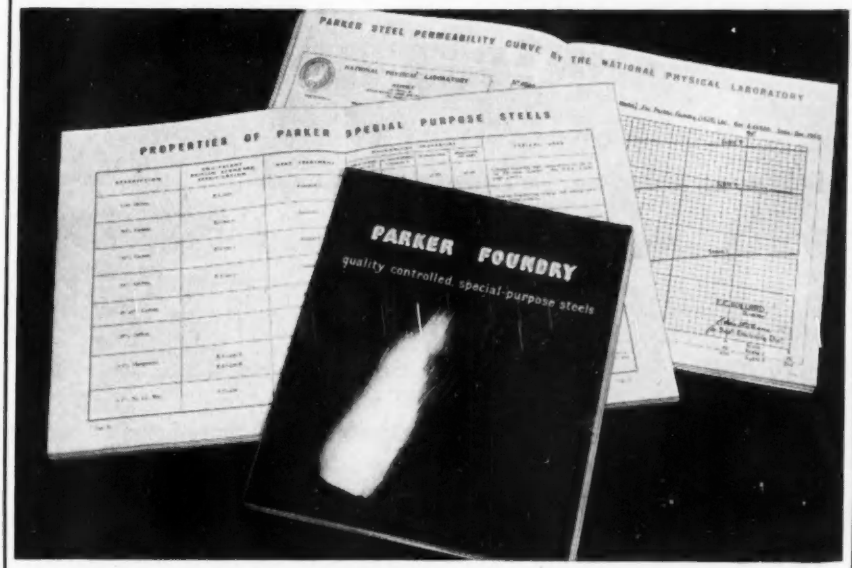
For the Electrical Industry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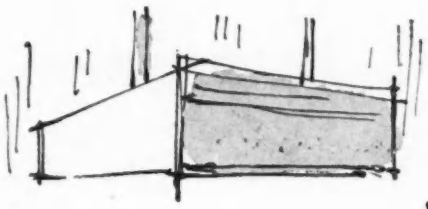
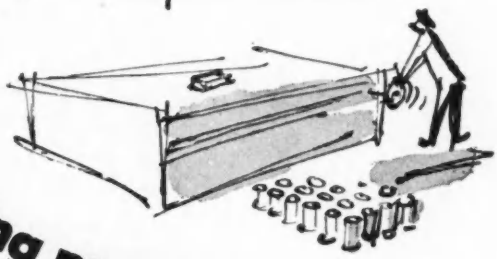
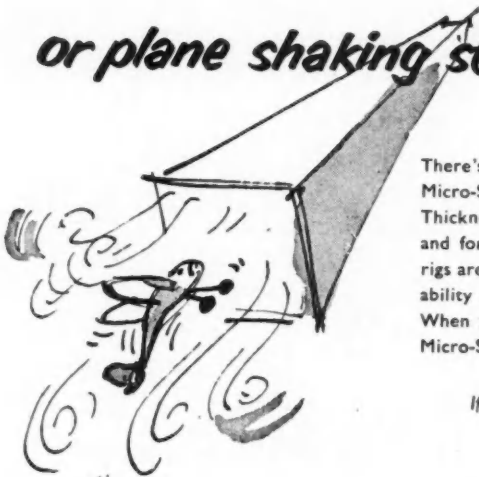




for can making presses

or plane shaking stresses



There's no limit to the applications in which BURGESS Micro-Switches have been successfully employed. Thickness control of steel sheets for can-making . . . and for actuating the stress recorders in airplane test rigs are just two further examples showing the adaptability of these snap-action precision-built switches. When you have an automatic switching problem, our Micro-Switch Division will be most happy to assist you.

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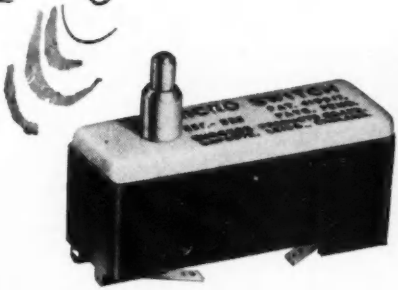

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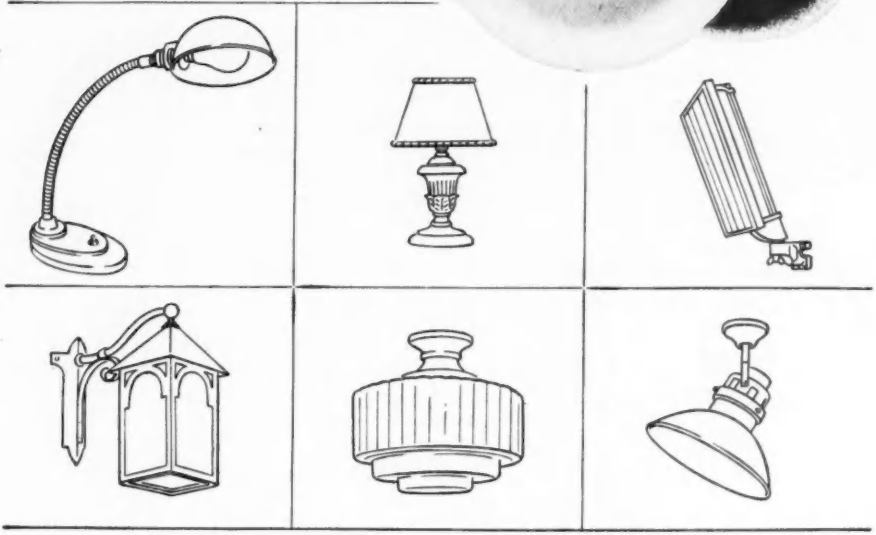

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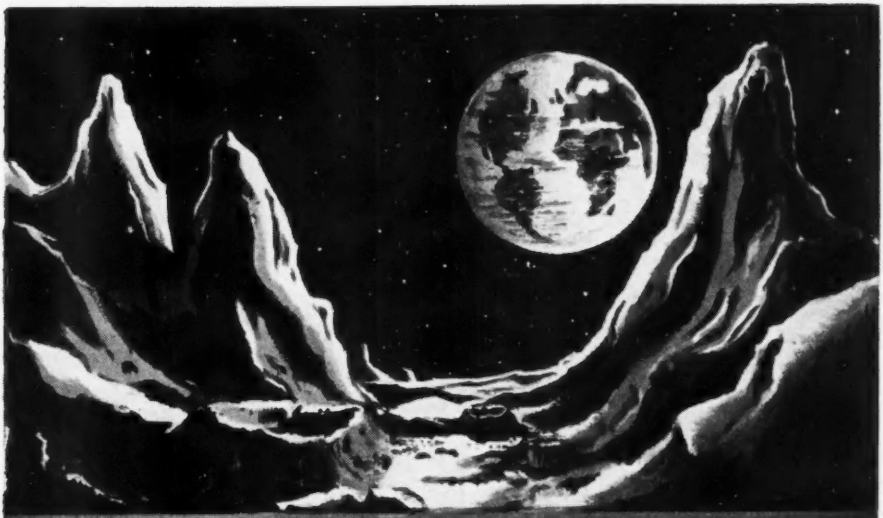

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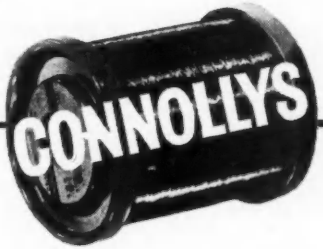

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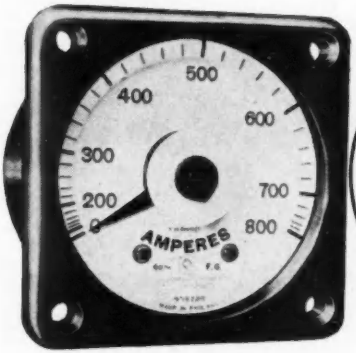
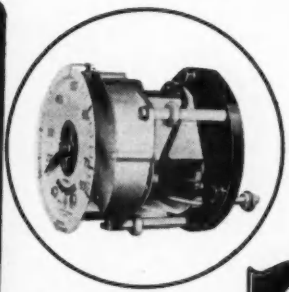
Send for List today.





The inside of the Moving iron instrument.

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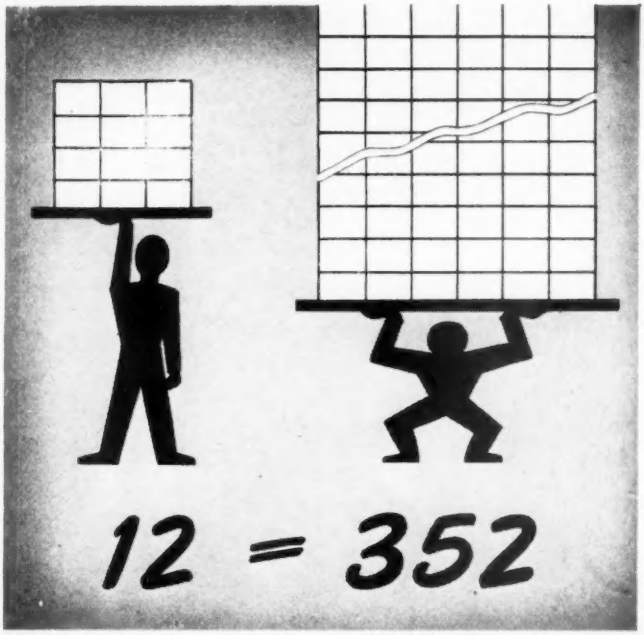

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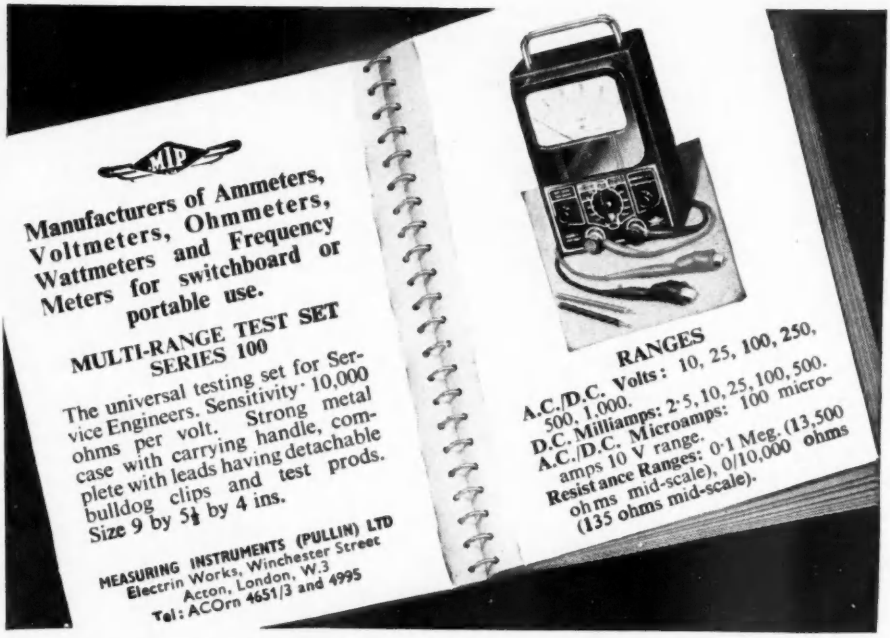
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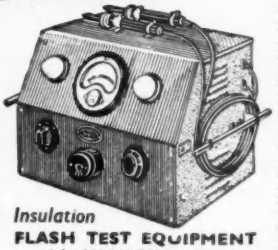

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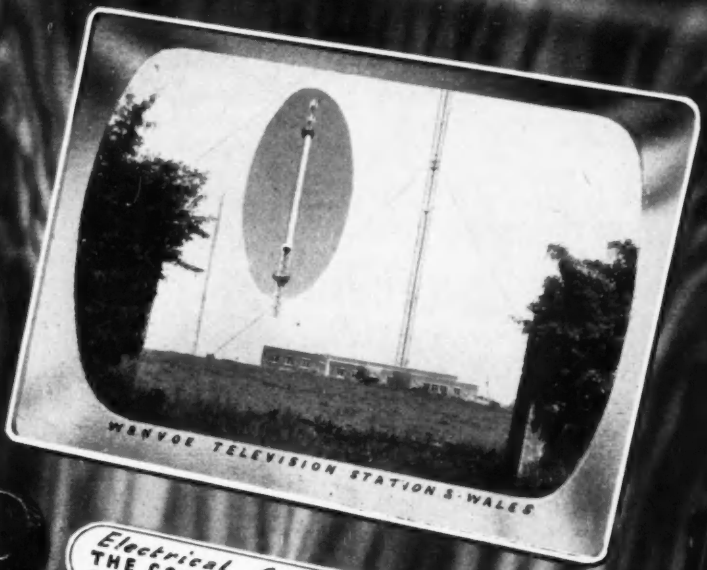

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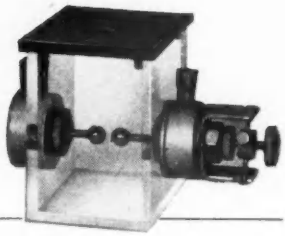

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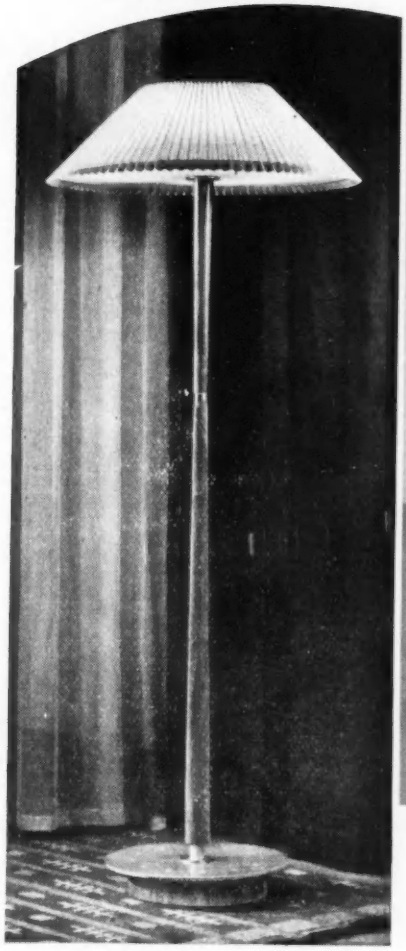
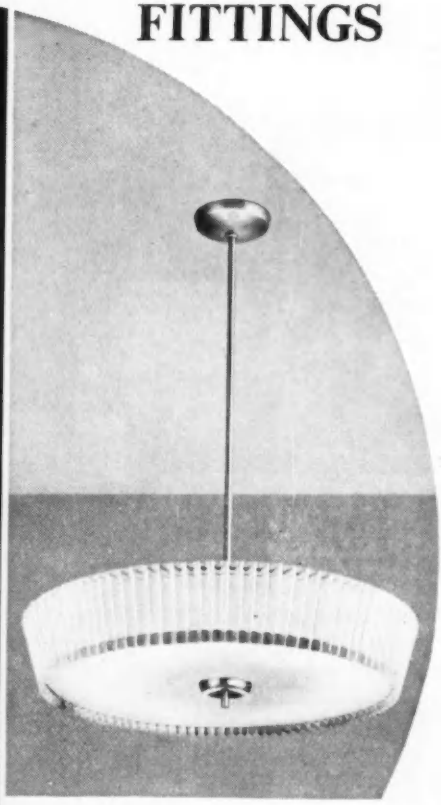
LIGHTING FITTINGS





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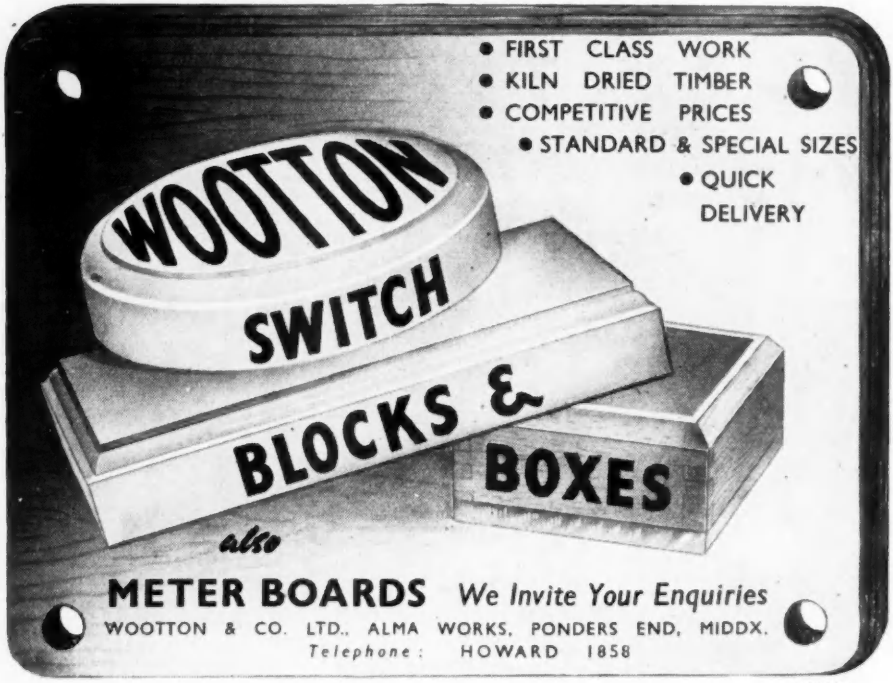

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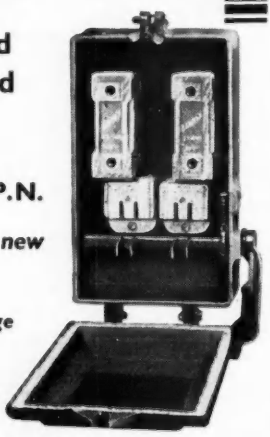

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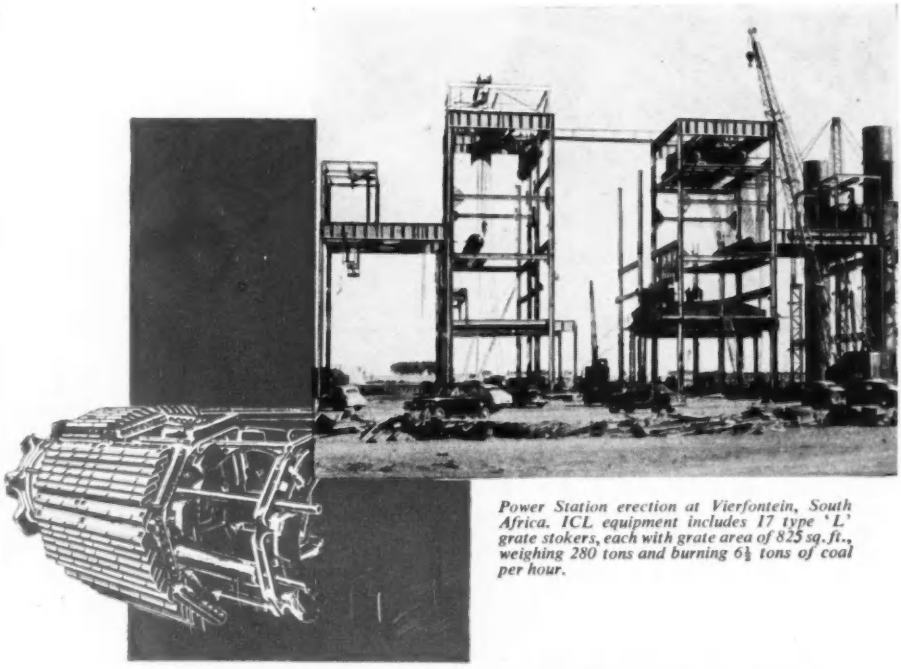

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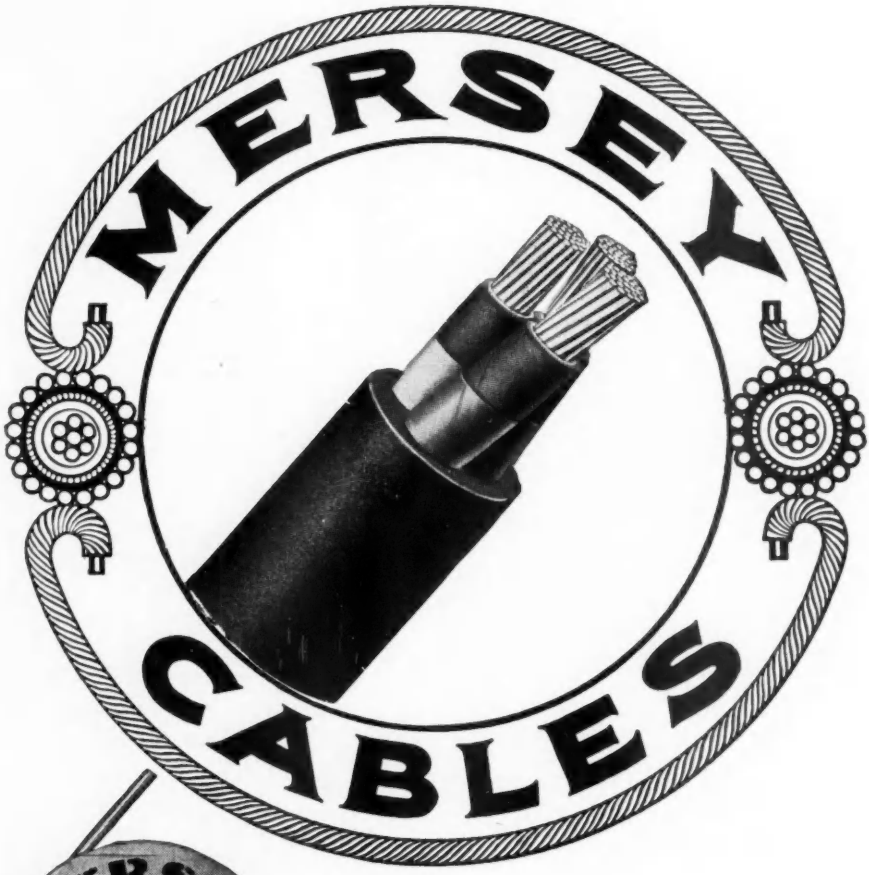

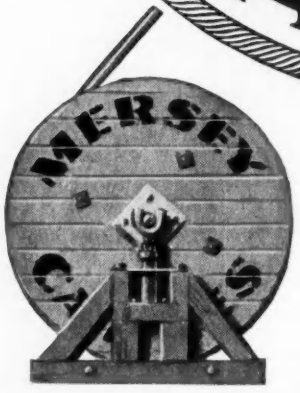

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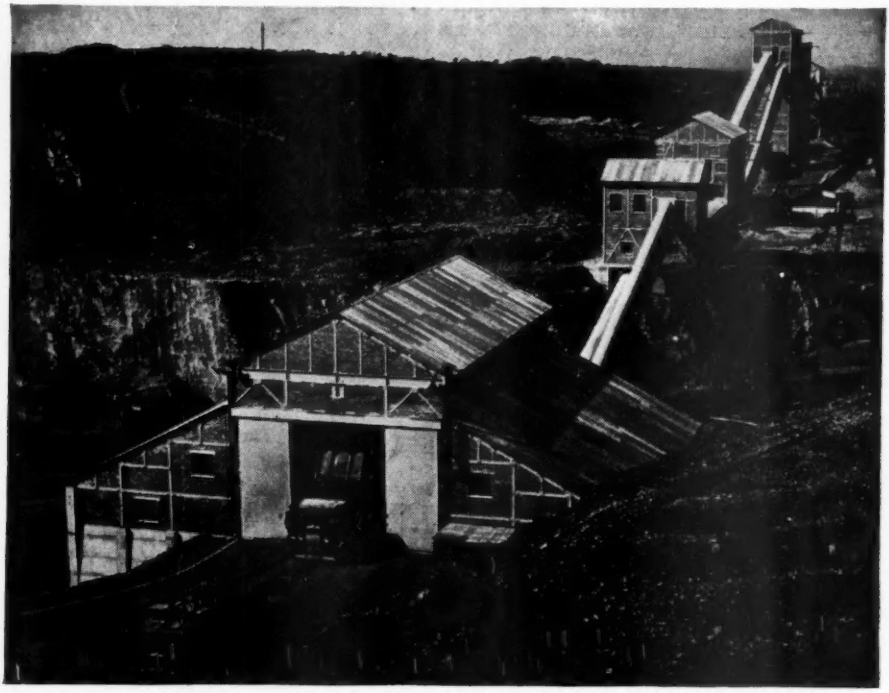

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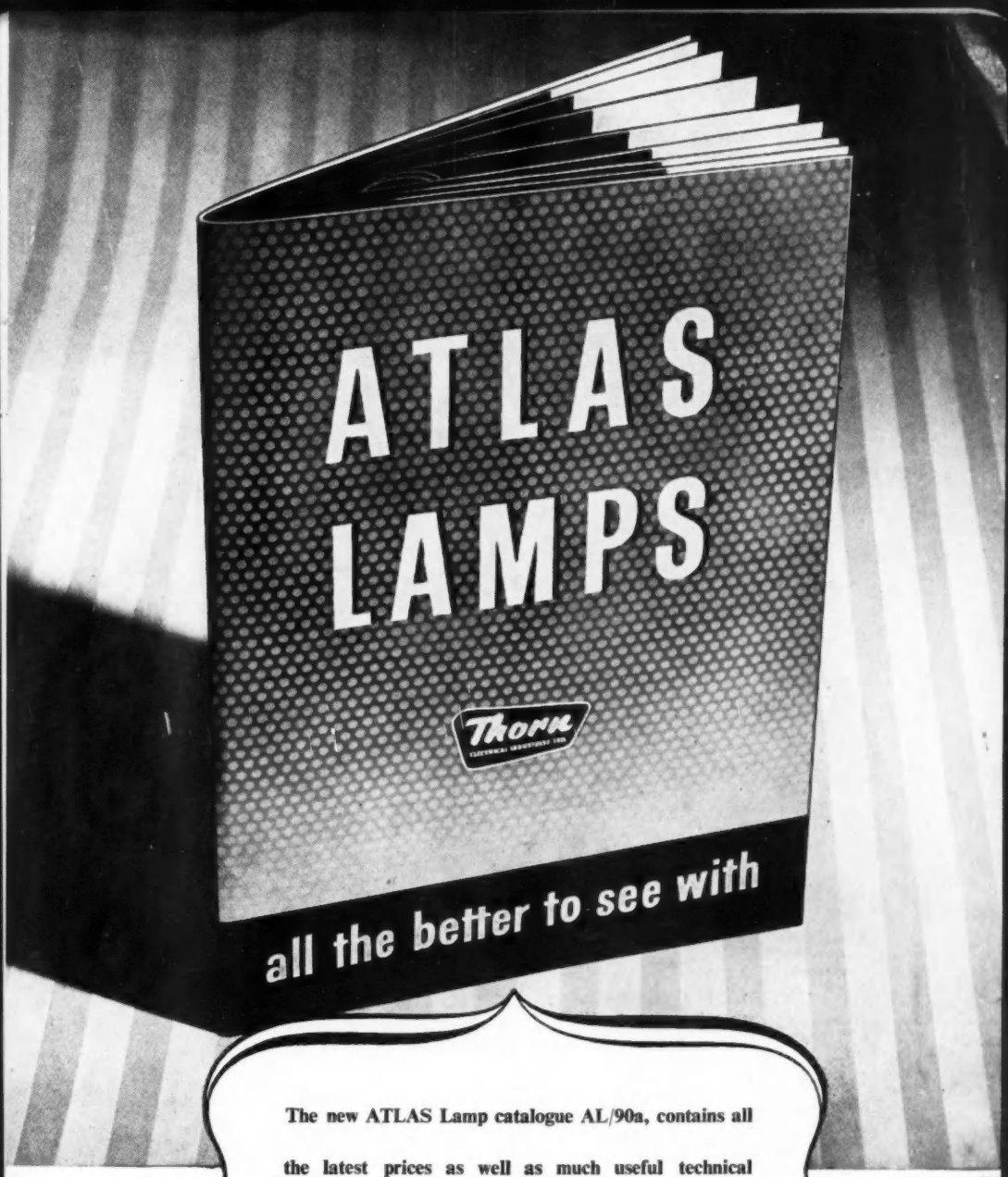

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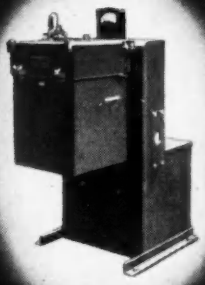

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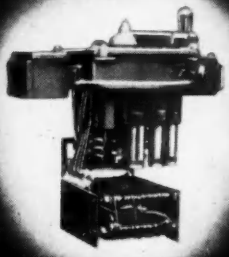

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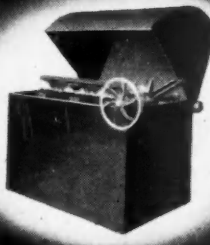

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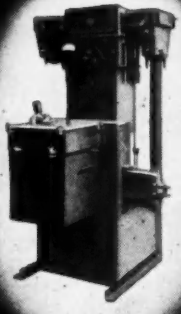

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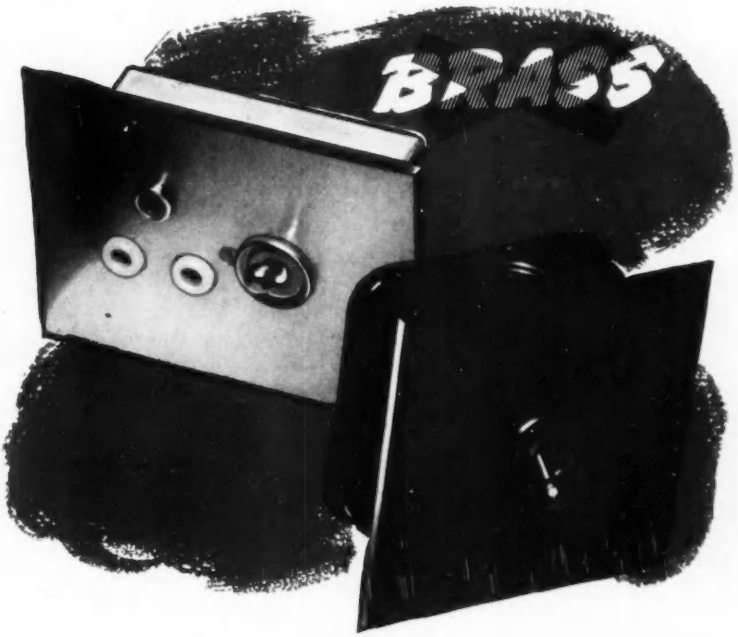

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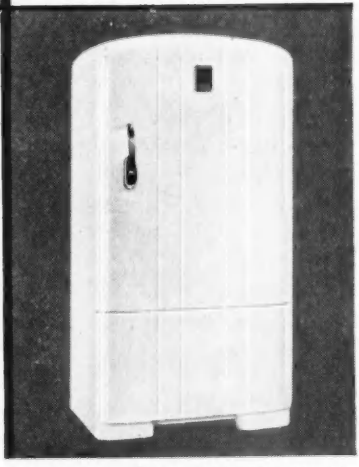

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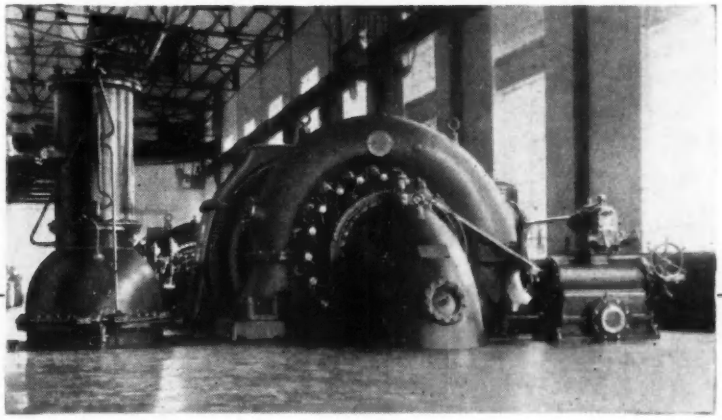
A power problem in Brazil



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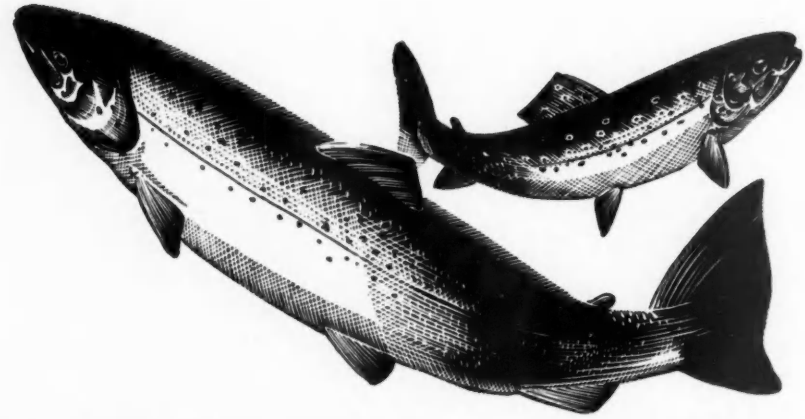

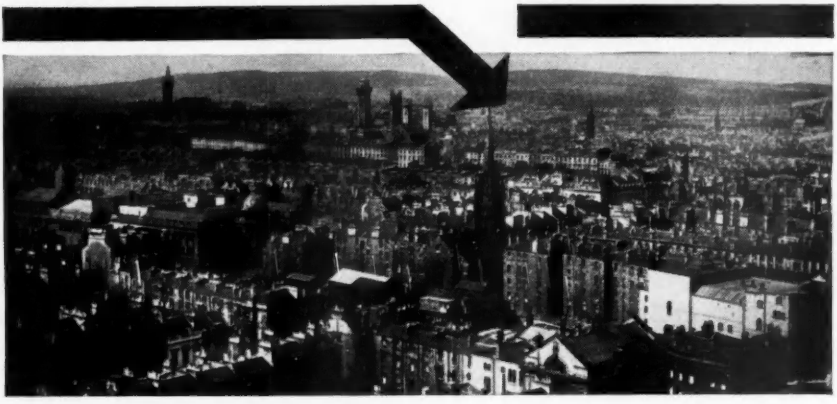

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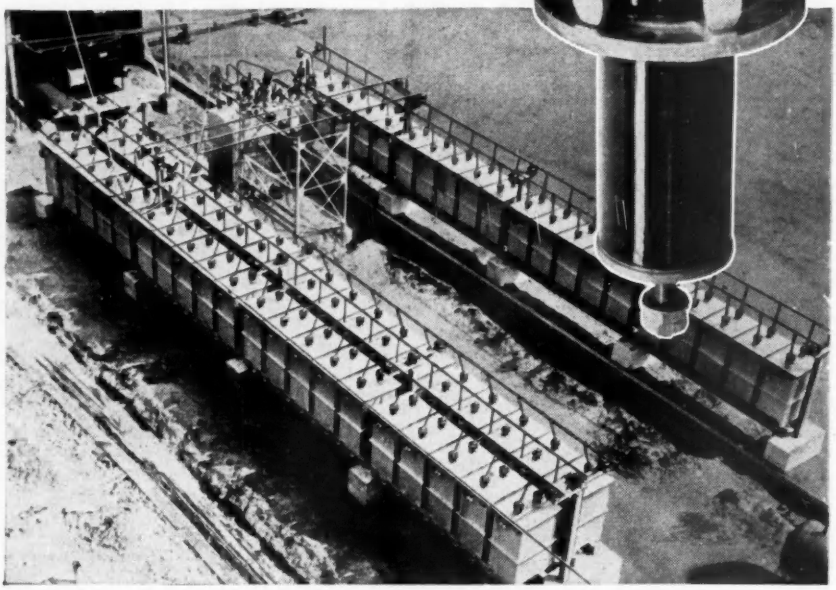

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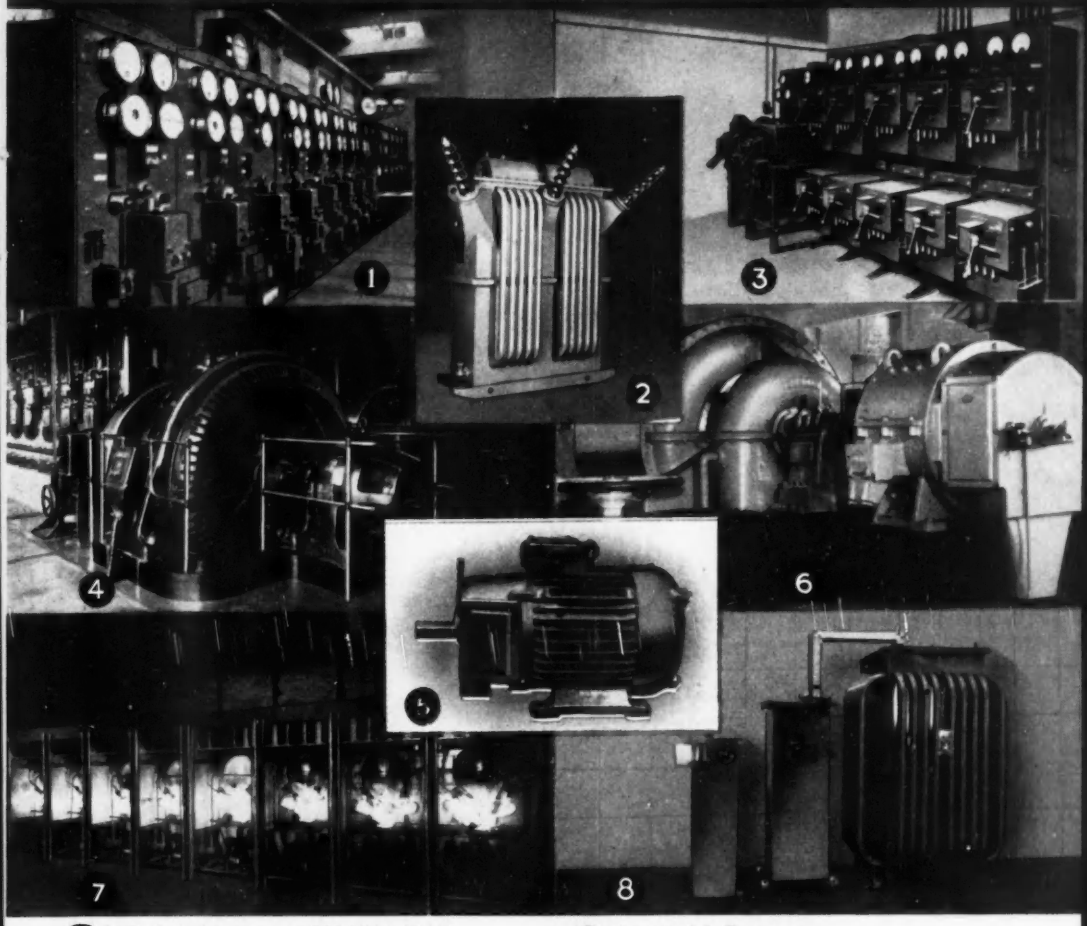

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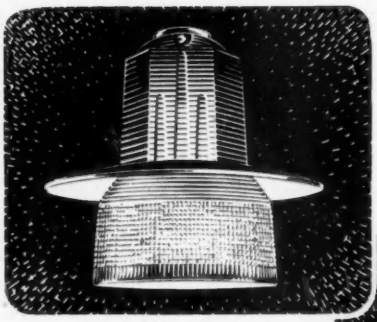

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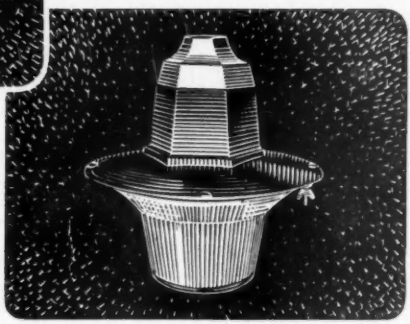

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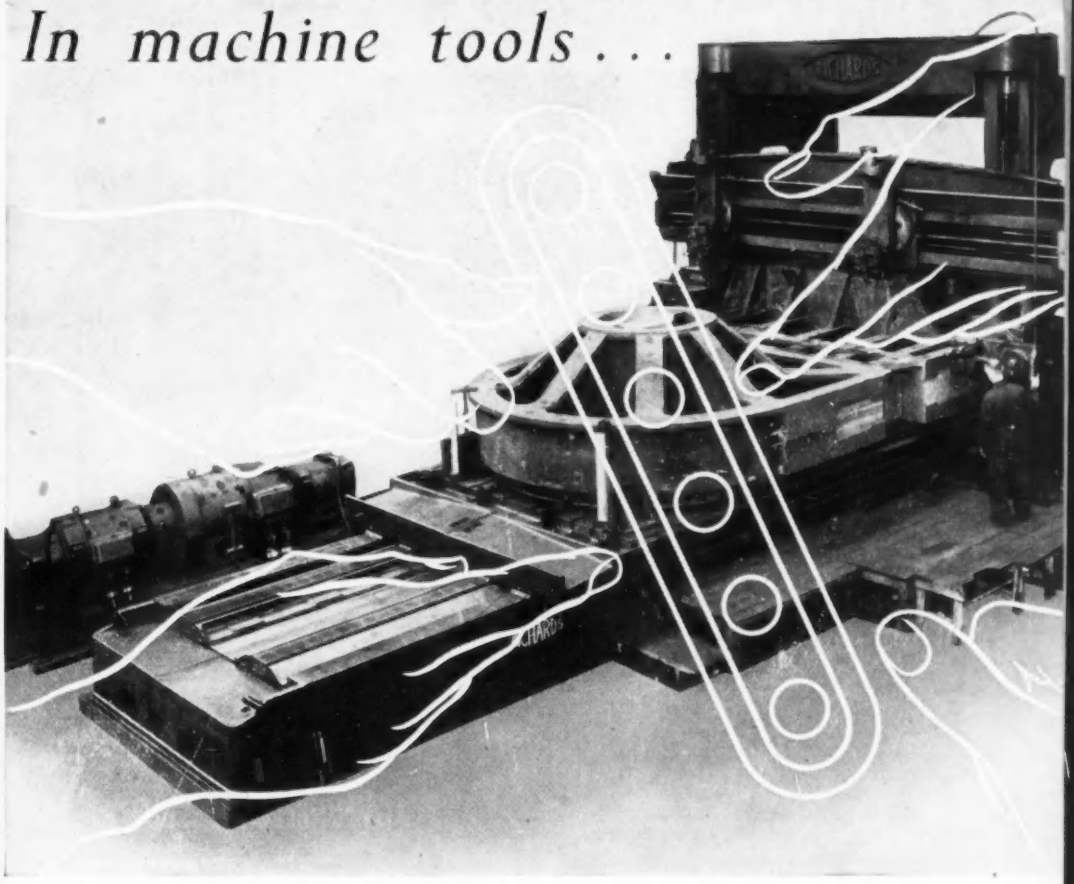

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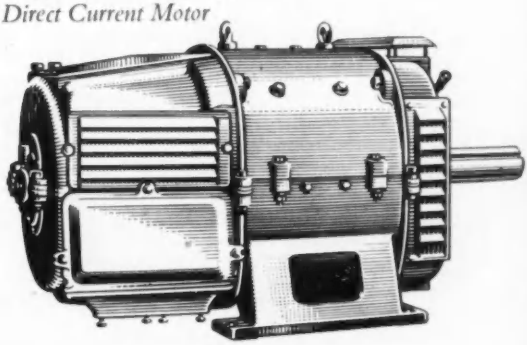

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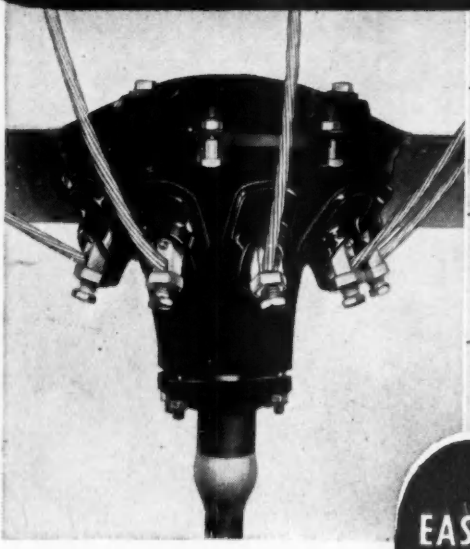

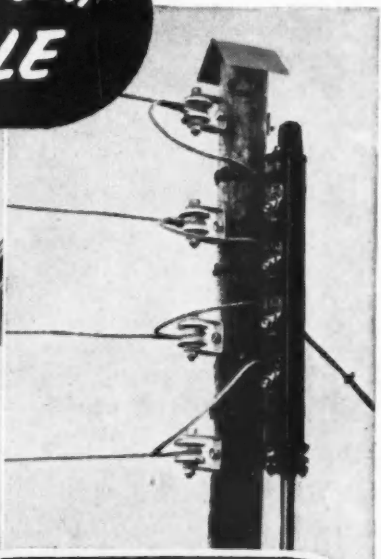

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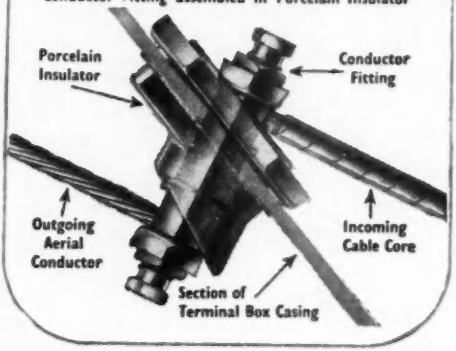

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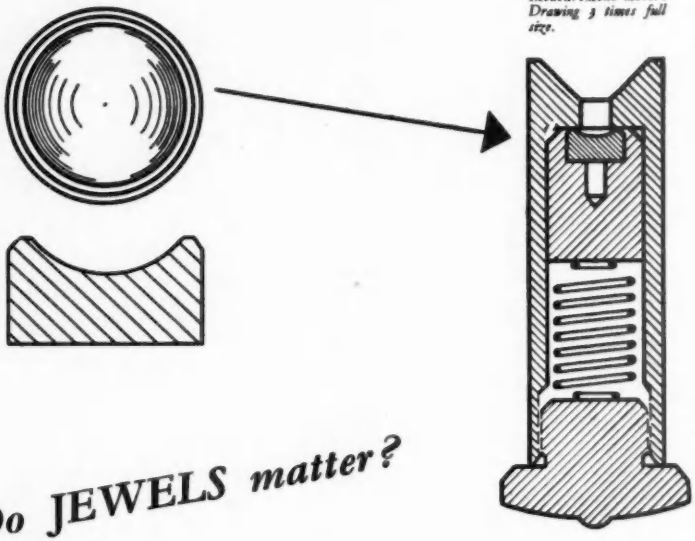

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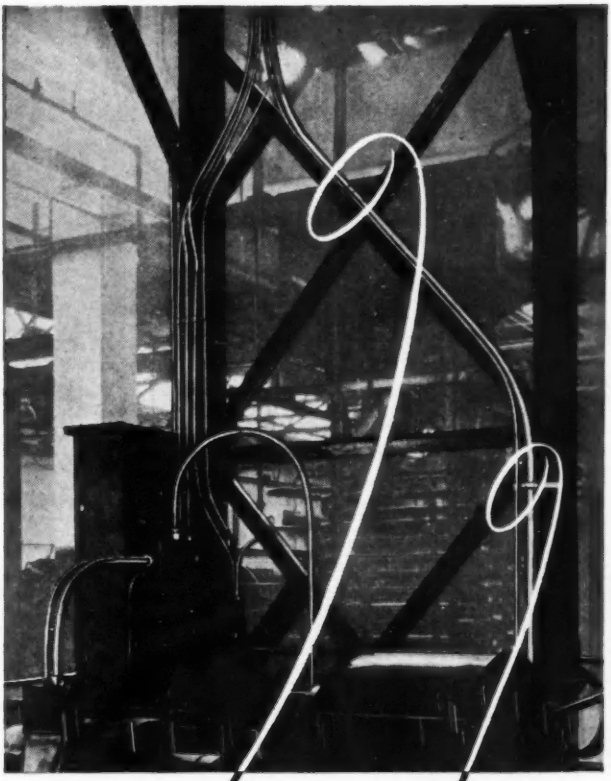

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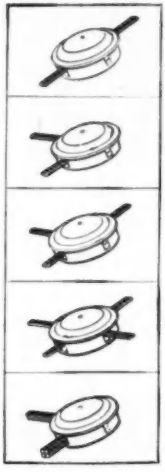

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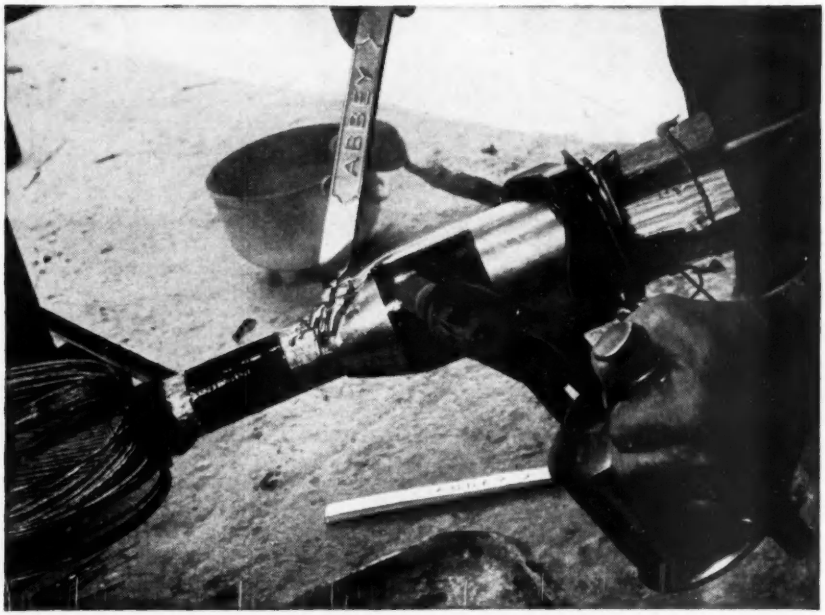

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ELECTRICAL TIMES

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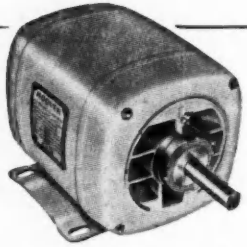

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Editorial

BRITAIN'S PART

IN this issue will be found an article on the activities of the Committee of Electric Power of the United Nations Economic and Social Council. Too little is known in this country of the work of this committee, largely because the Ministry of Fuel has so far declined the invitation from Geneva to send official representatives to their meetings. Whatever may be the justification for such a decision when the committee was more closely associated with problems intimate to the Continent, under the broadening sphere of its interests and its growing influence, it is essential that Britain should take its seat at this international table. Even countries behind the iron curtain are co-operating as far as political discretion allows. It is to be hoped, therefore, that the recent change in the permanent secretary at the Ministry will afford an opportunity for re-examining the possibility of official representation. International co-operation, if it is to be really effective, must be vertical as well as horizontal, and to omit one level of liaison is like leaving out the switchgear in a power station.

APPLIANCES FOR SALE

THE domestic load cannot increase significantly without the purchase of new appliances by consumers. This is the background to the need which was stressed in this column last week for active load building, and it is underlined by the sales and production figures for electrical "consumer goods" during the first six months of this year. The total value of radio and electrical goods sold has remained fairly constant, but this owes much to the extension of television's coverage. On the other hand, several important current-consuming items show seriously reduced supply. Cookers are the worst hit, with June production down to less than half last year's average, and the latest figures show a continuing decline. For water heaters there is a similar, though less marked, trend, and while figures for fires are not available, they are hardly likely to tell a happier story. Without a great improvement in this situation, the desired improvement in domestic demand will not be obtained. The production figures give an indication of the close co-operation and hard work required from area boards and retailers to get the load trend back on the right track.

MOVE TO SAFETY

STATISTICS showing the causes of all outbreaks of fire attended by public brigades have been collected for some five years now. In that time there has been one aspect of the returns that has given some concern to those interested in the good name for safety which electrical manufacturers had built up for their domestic appliances. Television sets, electric cookers and electric refrigerators were noted as the cause of an increasing number of fires, and in successive years the totals mounted at an alarming rate. It is therefore with satisfaction that the latest analysis—that for 1950—will be studied, for it suggests that in all the cases mentioned the rise in number of incidents has not continued. To some extent this is probably a reflection of the weeding out of unsuitable pre-war equipment which has been kept in service during the war and immediate post-war periods. In the case of television sets there is direct evidence of this in the difference between the incidence of fires starting in television sets in the Sutton Coldfield area, where nearly all must be up to date, and the Alexandra Palace region, where many earlier models were in use. While the age of sets has some effect, the magnitude of the difference is largely a measure of the advances made by designers in pursuit of greater safety. Not until 1951 totals become available will the trends suggested by the latest reports be

confirmed, but they seem a satisfactory outcome to what at one time seemed likely to become a serious problem.

WINTER SUPPLIES

IF industrial production is to make the spurt this winter that everyone desires, it will need freedom from worry about its raw materials. This point has recently been the subject of an official Treasury statement; one that presented a more optimistic view of the situation than seemed likely a few months back. Coal, a basic factor in success, is in good supply, with stocks at a higher level than at any time since the war. Steel presents a more complex picture, but on balance supplies seem likely to exceed last year's level. If this proves to be the case, and an increase in engineering output results, then the demand for non-ferrous metals will correspondingly increase. How far this can be met is a question of special importance for all branches of electrical manufacture. There have been significant movements in prices and controls, and only in the case of copper does it appear likely that serious restrictions on supply will be experienced. Stocks of this metal are well up on last year's low levels, although consumption has been running higher, but the position is not yet satisfactory, and the electrical industry especially is likely to continue to suffer from under-supply.

TECHNICIANS TOGETHER

IT was in the winter of 1950 that a joint committee of the I.E.E., B.E.A.M.A. and the Radio Industries Council produced a report on the training and education of technicians, in which it was suggested that there was a deficiency of suitable technical associations for such men. Since that date there has been considerable activity amongst existing organisations to see how far they might fill the bill by expansion or modification of their present arrangements. The usual stumbling block, dislike of being known as a technician rather than engineer, has been well in evidence, but it has become less serious with the committee's reaffirmation that the division is vertical on the organisational chart. The technician may well gain promotion to managerial grades. With this reassurance, at least one association has modified its rules to allow it to cater specifically for the electrical technician, while another more specialised organisation now feels able to co-operate in the educational field with a clearer conscience. It would be optimistic to expect, however, that when the dust of re-organisation dies down, any real difference in the electrical scene will be apparent. Facilities provided as a result of some benevolent superior body's interest are liable to suffer from neglect, and this may well be the case here, though energetic recruiting and good service could perhaps overcome this difficulty.

WHO'S TO BLAME?

INTERESTING highlighting of problems in the interpretation of the Electricity Regulations can safely be anticipated in Mr. Swann's annual summary of electrical accidents and their causes. An official preview of the notes for 1950, soon to be published, suggests that this time a basic difficulty has been chosen for special emphasis. This is the familiar trouble of the chain of responsibility. Regulations on the subject necessarily plunge into a somewhat confusing welter of "authorised" and "competent" persons; the stories in Mr. Swann's report present a clear picture of the problem as it usually arises—orders relayed down a ladder of authority, with assumptions consciously made at one level and regarded as facts lower down, finally an accident resulting from misplaced confidence. As a safeguard against such occurrences, the three criteria in the official notes on the regulations applying to competent persons cannot be bettered. Summed up, they are, adequate technical knowledge of electricity, sufficient experience in the type of work concerned, and detailed knowledge of the system being worked on. A mental check on the qualifications of the workmen against these points in any case where non-routine jobs are to be tackled is a worthwhile precaution for any supervisor or foreman.

Meteor

Repair and Maintenance of SMALL ELECTRIC TOOLS

Types of bearings likely to be met are discussed in No. 2 of this series

by KARL WILKINSON

THERE are many methods of providing bearings in portable tools. The better quality and heavy duty machines are nearly always fitted with ball (or needle) bearings throughout. Lighter types have a sintered bearing at the commutator end and a ball race on the drive end while the gear head may well be a combination of the two methods. As mentioned elsewhere ordinary P.B. bearings are rare.

The bulk of portable tools have either an ordinary single row race, a self aligning race

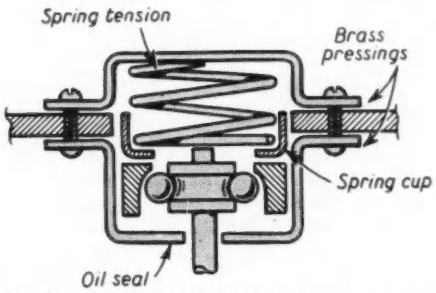


Fig. 13. Spring loaded bearing often incorrectly assembled

or the magneto type bearing. Certain assemblies of the latter warrant explanation. Fig. 13 illustrates a bearing that is frequently assembled incorrectly. It has a spring in the end cap which, by pressing on a cup engaging the outer race of the bearing, takes up play. It is a perfectly normal spring loaded bearing but is so often assembled with the outer race reversed and placed behind the ball cage. Fig. 14 shows a more common method of spring loading a

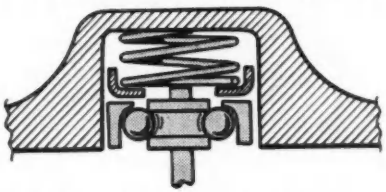
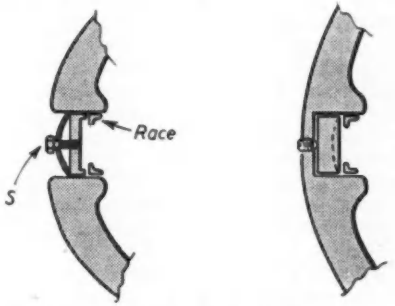


Fig. 14. Spring loaded race in blind hole

race in a blind hole which usually gives no trouble either in dismantling or assembling, but where the race is badly worn and the holes in the ball cage have become enlarged it may be impossible to reassemble it as the balls will persist in riding up on to the land of the inner race and then become too large in diameter to enter the outer race.

Fig. 15 illustrates a method using a magneto type race without spring loading. The bearing is backed by a plug, sliding in the housing, which adjusts end play and the plug is locked in position by the dished steel washer and cramp screw S.

A very similar arrangement is seen in Fig. 16 using either a magneto or normal race. Adjustment is by a grub screw passing through the housing. After adjustment for end play the screw is locked by a punch driving the housing metal into the saw kerf.



Figs. 15, on the left, and 16 show two types of assembly using magneto-type ball races

Where magneto races are used without any means of adjusting the outer races, which are fixed in their housings, play is taken up by adding shims behind the inner races on the shaft. This is a normal practice and a method used in magnetos and yet it means more bother for the repairer for two reasons. Firstly, he may have difficulty in drawing the races off the shaft unless he has a range of special pullers used for this type of bearing. A tool may be

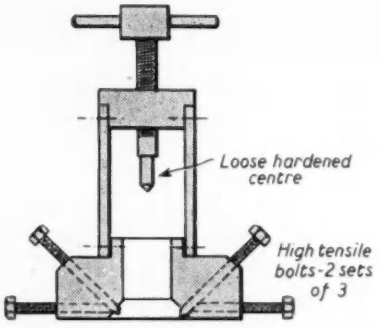


Fig. 17. Tool for removing magneto-type races

made from parallel bars that will bolt on to the race and will permit withdrawal either in a press or by using an ordinary two legged pulley drawer. Several holes can be drilled in the two bars to accommodate various races.

Another type of tool for the job is shown in Fig. 17. This tool requires a little machining—we assume all maintenance men have a lathe at their disposal—and high tensile bolts, say six $\frac{1}{4}$ in. B.S.F., are wanted on the puller jaws. Such a tool will remove races and various parts that may defy normal attacks, including ball races crushed up almost flush to an adjacent part. Needless to say such fitting is bad practice and indicates poor design by the makers of such mechanisms. In the second place, having removed the races, the repairer may lack the necessary shims to take up a few thou. play. In the absence of steel or brass shims, hard paper, e.g. leatheroid, will serve quite well. (It should be remembered that some machines have the outer races pressed into a fibre lining in the housing, and it is also the normal procedure in magnetos to have the outer race crushed in a paper lining to insulate it from the main frame.) Magneto type races should not be fitted too tightly.

The commonest arrangement is that shown in Fig. 18 where a sintered bearing is used at the commutator end and an ordinary ball race the other. The drive end bearing locates the armature in axial position.

Occasionally a race is left behind in a blind hole instead of being drawn by the shaft. This can give a lot of trouble. There are on the market special extractors for such jobs but they are rather rare in ordinary shops. The easiest way is to drill two small holes through the housing to meet the outer race and so punch the bearing out. Some makers, with very commendable foresight, provide two such holes in their machines.

Bearings, Bronze and Sintered

Ordinary P.B. bearings are seldom used now in portable tools except for certain purposes to be described later. Although P.B. bearings give excellent results and under good conditions may outlast any other type, there are two good reasons why they have been outmoded. In the first place an efficient and *constant* supply of lubricant to the journal must be provided, either by a well and oil ring, obviously impossible in a portable tool, or by a felt or wool wick, usually under spring pressure, conveying the oil directly to the shaft via a hole in the bearing. The wick-fed bearing is an outstanding success in small squirrel cage motors but is not so easily applicable to a portable tool because of the space required around the bearing for the oil reservoir. Space, being at a premium in hand tools, naturally rules this out for most purposes. Secondly, we have the question of price. A P.B. bearing may cost six times that of its modern counterpart, i.e. a sintered or self lubricating bearing.

We can illustrate the bad application of the P.B. bearing in the commutator end of certain early drills, blowers and vacuum cleaners, of the blind tunnel variety, where the only lubrication is by a very small wick in a tube often integral with the very thin cast aluminium housing, and furnished with that dangerous device, a spring oiler. Similarly we can also illustrate the bad application of a sintered bearing where they are used on the drive end of a portable tool when the loading is excessive and a ball race should have been used instead. Some makers have modified their designs and now use ball races on these heavily loaded journals. When used correctly the sintered bearing is most successful.

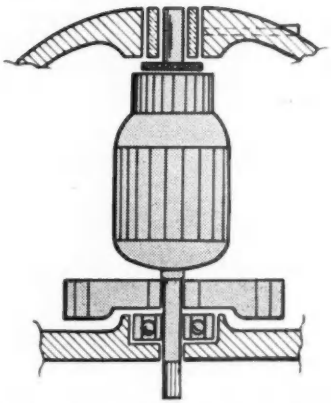


Fig. 18. A common bearing arrangement

Plain bronze bearings are still used, for example, on some drills fitted with a morse taper socket and no chuck. The bearings for such sockets are quite long—3 to 5 in.—and as the speed is low adequate lubrication is provided via the gear head.

Should it be necessary to make and fit a new P.B. bearing to a tool, the repairer must take care that the original bearing is copied in design as far as possible. Certain machining operations will of course not be easily followed, such as the very common figure-of-eight oil way in the bearing surface. This can be replaced with a channel, shaped in the lathe by a cutter in a heavy bar in the tool post. See Fig. 19.

Normally the channel, as was the case in the figure-of-eight, does not reach the extreme end of the bearing, so preventing escape of oil. Larger bearings may have the channels cut in pairs, one passing through each edge of the oil hole, which must be of adequate size for the wick. A more elaborate bearing, that is incidentally most suitable for use when replacing a bearing in a f.h.p. motor, is shown in Fig. 20.

Fig. 19. Substitute for figure-of-eight oil way

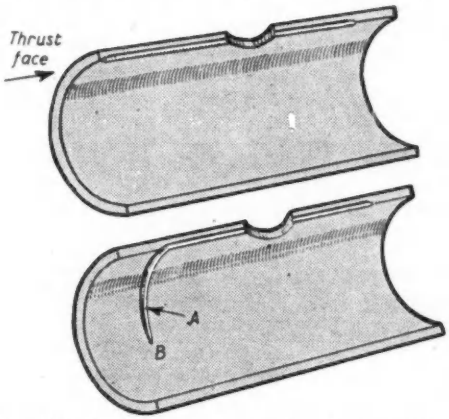


Fig. 20. Replacement bearing for f.h.p. motor

The radial channel A is cut by hand operation in the lathe, using a normal boring bar, the depth of cut being such that the channel is lost at B; that is the channel only encompasses three-quarters of the bearing surface. This may be a rather unusual method but it is most successful.

There is one type of very small P.B. bearing occasionally met in tools, where the hole is too small to be bored with ease, or alternatively, a bearing may have been bored small and after pressing in position may be rather close for running purposes, especially if the bearing assembly is slightly out of line, not necessarily as a result of poor machining but usually by reason of distortion of an end plate. Indeed many small tools, and for that matter motors of various kinds will be found to have the bearing boss and bore distinctly out of centre with the spigot register, accuracy being achieved in the final assembly by jig boring and possibly broaching the two end plates in line. Other tools will sometimes have the P.B. bearing, as a blank, cast in the aluminium end plate. Naturally a bearing of this type cannot be pressed out so must be bored to take a liner.

A very simple reamer can be made to enlarge these small holes. A piece of silver steel is turned down to fit the bore. After polishing, a very light cut is made as in the drawing with a *very sharp* chisel. If the cut is too heavy it can be eased with a toolmaker's dead smooth file. This simple reamer, rotated at a suitable speed and lubricated, will remove a few thou. from a bearing and give a good finish. It is hardly necessary to add that expanding reamers below say a $\frac{1}{4}$ in. are not exactly common whereas this simple device can be used in holes of $\frac{1}{16}$ in. and upward. See Fig. 21.

Sintered Bearings, Oil Retaining

This type of bearing is now so common that little remains to be added by way of explanation.

It should be remembered that in spite of the fact that they are self lubricating the lubricant must be replenished as necessary. In some applications a bearing may not be furnished with any means of additional lubrication. This is not a very good practice and the normal fitting provides a felt pad either touching or surrounding the outside of the bearing to supply the lubricant unless the bearing is adjacent to a grease-filled gear head. No hole is required in the bearing wall as is the case with P.B. bearings.

Some makes fit a cartridge type of bearing, especially the self aligning type where the bearing is spherical, held between two spring dished plates and surrounded by a felt pad.

There is no particular difficulty in replacing these bearings, but should the correct sintered

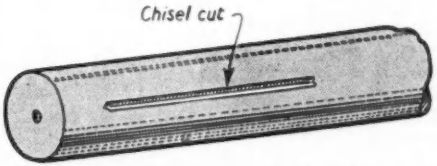


Fig. 21. Simple reamer made from silver steel, suitable for enlarging small holes

bearing be unavailable, do not replace with one made from ordinary P.B. as it will most certainly fail very quickly if the same method of lubrication is used, that is, unless additional lubrication is provided.

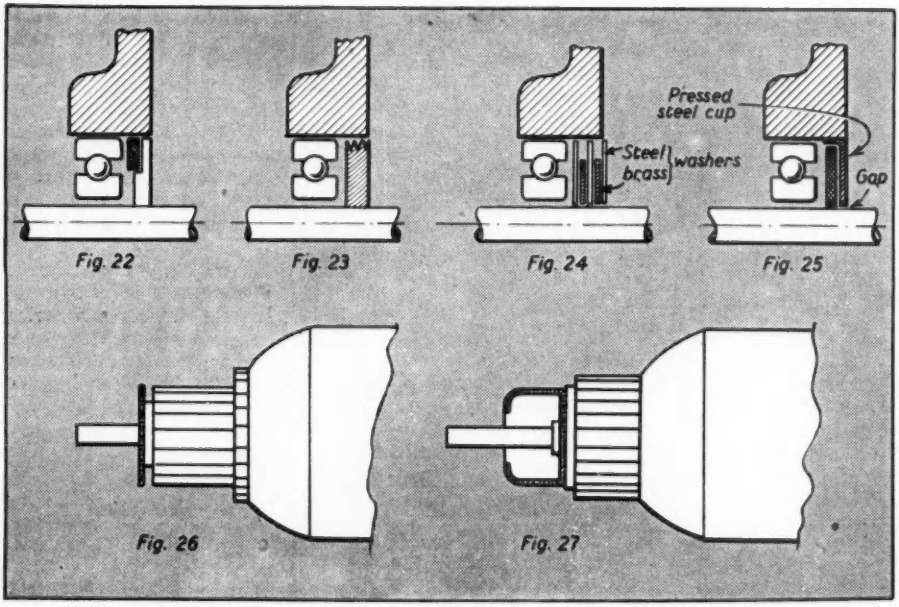
The removal of a sintered bearing from a blind hole can be very trying. Various means can be tried such as screwing in an old tap and so extracting it, but as many of these blind holes are also found in the frequently mentioned blind tunnel castings they are not easy to get at. On rare occasions the shaft itself can be used as a kind of hydraulic ram in the bearing, previously filled with heavy grease, so forcing it out. This is an ingenious gag but does not always work and the repairer usually finishes up by cutting down the side of the bearing with a D chisel. This may slightly score the bearing housing but if carefully done the damage is negligible.

New bearings should be pressed and not hammered in position, using a mandrel press or failing this a vice for small jobs. Normally the original shaft will operate quite satisfactorily in a new bearing but where close fitting limits have been used by the makers the bearing may be too tight to be serviceable.

In production such bearings are pressed in with a fitting pin, of correct dimensions, so preventing the bearing from closing. This is hardly a convenient method for a repairer unless he has long runs of similar jobs and has the tools to hand, or unless he can afford the time and expense to make these fitting tools. He will, therefore, naturally think of reamering, but this is not a good policy as apart from ruining the reamer—unless it is tipped—the process will also to a certain extent close the pores of this otherwise very porous bearing. Indeed as the tightness will probably be seen as a narrow rub in the bearing a little attention with a very sharp scraper will almost certainly suffice. It is, moreover, more probable that the new bearing will still be a slack fit as a result of wear on the shaft. This may certainly be the case in some small competitive drills on the market where the running tolerances are, to say the least, very generous.

As these bearings are so cheap—a matter of pence—and a wide range is easily available, the repairer's problems are eased considerably and he can hold in stock a wide variety. This is helpful in another way because in an emergency an out-of-stock bearing, of the larger size, can often be repaired by boring out and pressing in a smaller stock bearing of the correct bore. Although the sintered metal is so soft a tipped tool is required to machine it.

Figs. 22-27. Types of seals used to prevent the loss of lubricant from bearings



Oil Seals

It is obviously necessary to prevent the loss of lubricant from a bearing and to prevent the lubricant from travelling to unwanted places, especially at the commutator end of an armature. There are several methods of achieving this :

(1) By closed ball races. That is the ball cage is covered with a steel disc, with or without a felt pad. Some of these races can be opened up for cleaning while others are permanently sealed. (2) By a stepped or pressed steel washer and felt pad. See Fig. 22. Purely as a matter of interest many car dynamos have their bearings sealed in this manner. (3) By the conventional knife edge cut on lands on the shaft. A very common method in larger motors but seldom found in portable tools. (4) By some form of labyrinth. See Fig. 23 and 24. (5) By a cap over the ball race which presses in the bearing housing. These are very common in certain machines and very efficient, but they can be troublesome to assemble especially where, in one make, they have to be inserted when the armature is assembled complete with races. A simple tool may be required to press them in position as there is no room for the fingers, Fig. 25.

Where a commutator end shaft runs in a bronze bearing a small felt washer is frequently fitted, which, apart from acting as an absorber, also serves as a thrust washer. Other armatures have the actual end of the commutator fitted with a paxolin washer as in Fig. 26.

We can have also a specially constructed commutator with the boss as shown in the section in Fig. 27. Finally many small armatures are found with an extended (moulded) boss which, while it can hardly be called an oil sling, nevertheless prevents to a certain extent any oil passing along the shaft and reaching the commutator.

Wear in Bearings and Journals

Perhaps one of the commonest faults in a portable tool is a worn bearing. If it is only a worn ball race the job is easy, but a worn shaft or housing is another matter. If the makers are consulted they will most certainly recommend new parts. This is not always desirable either from an economic point of view or because of the delay in obtaining the necessary part, perhaps a complete armature. In addition, the make of the machine may be unknown or be of foreign manufacture.

Consider first a plain shaft in a sintered bearing. Even if the correct replacement bearing is available the shaft may be too worn to be satisfactory. Such a shaft can at times be sleeved up to size after turning or grinding down, and then will fit either the new bearing or the old one after scraping in.

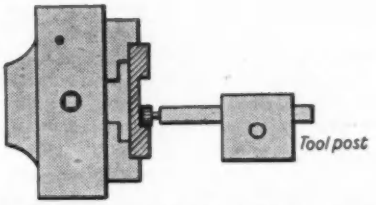


Fig. 28. Method of knurling ball race housing

Many armatures have the pinion cut integral with the shaft, and of the same size as the journal. This will preclude the possibility of sleeving as the pinion teeth will be lost in machining. A recessed split sleeve is not an easy alternative and such a fault will probably mean a new armature. In certain cases metal spraying can be used to build up the shaft prior to regrinding but such a service is not always available in every district. Ordinary welding is not advisable because the hardening will be lost on the pinion teeth. Electric welding can give excellent results on larger jobs but the shaft is always liable to distortion.

It is very common to find the ball race housing badly worn while the race itself and the shaft are still in serviceable condition. If the worn housing is in a part that can be easily chucked it can be internally knurled in the lathe using a knurl wheel on the end of a heavy boring bar in the tool post. See Fig. 28. If the wear is too deep for this method of recovery the housing must be bored out and fitted with a liner.

When bad wear occurs in some types of housing, it may not be possible either to knurl or line it because of the difficulty or even impossibility of chucking it. This would necessitate a jig rigged up to mount it on a faceplate; by no means an easy job. As a last hope shim stock is often used and if carefully done will be suitable.

Wear on the shaft carrying a ball race, can of course be also knurled except, as is so often the case, when the shaft is hardened.

The location of worn bearings is dealt with in a later section.

Chucks

The removal of a chuck for its replacement or repair can be difficult. Four methods of affixing the chuck to the gear head are shown in Fig. 29. (a) By screw thread (b) by taper

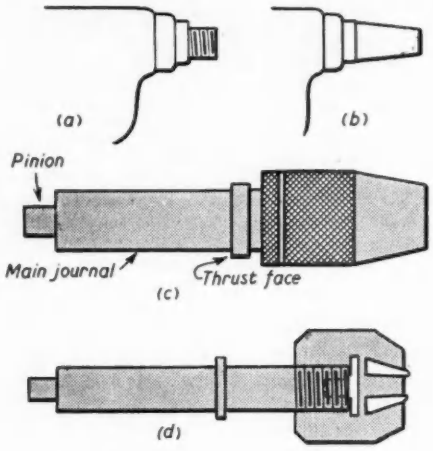


Fig. 29. Methods of fixing chuck to gear head

spigot, (c) where the chuck shaft is integral with the main bearing, (d) where the main shaft projects into the body of the chuck and actuates it instead of being merely a fixing.

Referring to Fig. 29(a) the chuck in question may have stamped on the body its capacity and some such remark as $\frac{1}{2}$ in. x 20, thereby indicating that it is screwed on to the mandrel with a $\frac{1}{2}$ in. thread, normally right hand of course. To remove such a chuck, according to the maker's instructions, it is usual to insert the key pin in one of the chuck holes and give it a smart tap with a mallet to unscrew it. This sounds so very simple but the poor repairer may become exasperated after several tries especially on an old drill with possibly rust on the screw thread. Try a little heat and a spot of penetrating oil and use a short piece of silver steel inserted in a chuck hole. In extreme cases it may be necessary to dismantle the gear head and securely scotch the main pinion on the mandrel with a piece of steel, cut to wedge in the housing in order to offer sufficient resistance to the blow on the steel pin. A better means of scotching a pinion is to use an old pinion cut to wedge between the part to be held and the wall of the housing. Be careful of the housing; some of them are very thin. This, incidentally, is a normal procedure in dismantling certain magnetos.

A similar trouble will be met in Fig. 29(b) with a taper fixing. The best method is to use a pair of folding wedges as in Fig. 30(a). These are threaded behind the chuck, laid on a bolster and given a smart blow, so drifting off the chuck. Nevertheless an old and rusted chuck may still require penetrating oil and heat or the gear head may be damaged by the wedges pressing against it.

If a new chuck has been fitted and is found to slip in use, the taper on the mandrel must be trued by bluing and refitting by hand in the usual manner.

Fig. 29(c) shows another and rather rare method of making the chuck and mandrel in one piece. Consequently the whole assembly may have to be replaced. Also in Fig. 29(d), a method only used in some very cheap pre-war Continental drills, a new chuck cannot be fitted as an individual item.

Chucks after long use may become very stiff to open and close. Washing out and soaking in thin oil will help but not if a jaw, or its way, is badly bruised. Most of the modern chucks can be opened up by pressing off the outer sleeve which carries, by a friction fit, a split nut. See Fig. 30 (b). When the chuck is dismantled the several parts can be cleaned and refitted prior to reassembly by pressing the sleeve back in position. Make sure that the jaws are equidistant before reassembling.

Although many kinds of chuck keys can be purchased in a good tool shop, both the repairer and the user may have to make a special key when they are unobtainable. The key head need not be milled as hand cutting and filing will be quite suitable. Use a piece of silver or nickel steel (an old armature shaft would do) for a blank and cut the teeth, previously marked, with a hacksaw and finish with a file. A quicker job can be made up as in Fig. 31.

Fig. 30(a). Folding wedges are of this general form

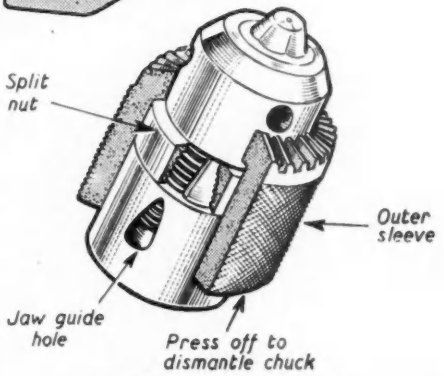


Fig. 30(b). Chuck construction

Fig. 31. Emergency chuck key

Grease

It is hardly necessary to say that lubricant is required in a gearhead. This is usually a grease, but for certain types of machines it may be a special gear oil. Naturally such a lubricant would be obtained from the makers of the equipment, but there are occasions when even the recommended grade does not meet the particular conditions under which the machine is working, e.g. a machine such as an electrical drill working in a cold open garage may require a different grease or lubricant from a similar tool used in, say, a stoke hole.

Examples can be found where bearings have failed in gearheads in spite of the fact that the cavity was adequately supplied with grease. This could happen where the temperature of the tool was too low or the melting point of the grease too high and as a result a bearing may rotate and form a cavity in the solid grease and eventually run dry. Such bearings can occasionally be found rusted while surrounded by a plentiful supply of lubricant.

In all cases a gear box or ball race housing should never be completely filled with grease as this will raise the temperature of the bearing to a surprising extent. This is a point that many maintenance men do not appreciate.

Our readers' views ...

Reference Books

MR. LLOYD PRICE'S list of text books, which he has adopted for reference purposes (August 14) raises, from the names in the early part of his list, the intriguing possibility that one can tell an engineer's vintage from his book-case. Text books are most familiar in one's student days, and it is familiarity that makes a reference book into a craftsman's tool. It would be interesting to know how many engineers agree with his selection; and of those, what proportion know any other possibilities.

LONDON, S.W.20 *"Statist"*

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Benghazi Story

I WAS very interested to read your article on the new Power House at Benghazi. I was stationed there with the British Military Authority for just over 12 months until my demob in September 1947. During my stay there I worked for the P.W.D. under M.Q.M.S. Jenkins, who was responsible for the electrical installations in the area. I remember that our Arab electricians and labourers were quite a good bunch of workmen on the whole. With regard to the old Power House, where we used to go for our meals, Capt. Collins and S/Sgt. Collins were in charge then. As stated in your article, the fuel pipe line was primitive, this consisted of lengths of pipe line lashed to empty oil drums which were towed out to the tanker and coupled together often in the dark, as the tankers arrived at any hour. The main job then was to keep the Power House going and it was really a job worth doing.

I expect that any other ex-Royal Engineers who read your article will be glad that Benghazi has a Power House large enough to meet the demand at last.

SNEINTON DALE, YORKS *S. Land*

◆ ◆ ◆

Static on Cars

REFERRING to the phenomena of static discharges, the following may be of some interest.

A complaint was received from a metal spraying plant of vicious sparks emitted by a gun during the shot blasting operation. This was frightening to the operator, who volunteered the information that the sparking had only appeared after he had fitted a new length of rubber hose to the gun.

The original hose was examined and a layer of metallised thread was found running through its length, effectively earthing the gun to the main frame of the plant. This hose had become badly worn and the operator had replaced it with ordinary rubber hose which had generated static when the metal shot was blown through at high velocity. Whilst awaiting the supply of a new special hose, the rubber hose was used with a small flexible wire taped to it from the gun to the main frame to discharge the generated static.

BRIGHTON, 6 *T. H. Snelson*

CROSS-CHANNEL LINK

THE announcement that the British Electricity Authority have approved in principle a scheme for a cross-Channel link with Electricite de France has caused a considerable amount of speculation among electrical engineers all over the world. Such a scheme is unprecedented in system engineering, although smaller projects have been successfully carried out. The difference in magnitude, however, between the largest of the existing underwater links and that envisaged in the B.E.A.-Electricite de France scheme is so great that many new problems, some of remarkable complexity, will need to be solved.

Economics

There can be no doubt that economically the scheme is sound. There are, of course, at this early stage, many imponderable factors which cannot be accurately assessed, but even assuming that the overall cost of the scheme, including the connection of the cables to the systems of the two countries, would be some £4,000,000, and the plant saving due to interconnection would be in the neighbourhood of 100 MW, the saving in capital cost alone would be some £2,000,000 (assuming power station costs of £60 per kW of installed plant).

The saving in plant would be made possible by the diversity between the peak demands of the two systems. This is illustrated by the diagram of load curves (Fig. 1) which shows the loads on the two systems in December, 1951, on the day of maximum combined simultaneous peak demands. This rose to 20,343 MW for the two countries. On the same day, the British maximum peak demand was 13,543 MW and the French was 7,150 MW, giving a total of 20,693 MW—a difference of some 350 MW. It can thus be seen that owing to the non-coincidence of the peak demand, power is available in one or other of the countries to supply a proportion of the peak demand in the other.

In addition, considerable savings in operating costs could be made by transfers of power at times when the incremental costs of production in the two countries differ materially.

It should be borne in mind that France has a considerable amount of hydro-power, located mostly in the south, and a fairly large steam power system in the north. Taking a yearly basis, the hydro power is, due to seasonal fluctuations in rainfall, variable in nature; the steam plant output is also variable due to the necessity for periodic overhauls. However, at certain periods the French system will have available spill power, and short-term power is practically always available from the hydro plant which can be usefully employed in overcoming peak-load difficulties in this country. This power can, in turn, be repaid by export from Britain, which by adjustment of the power flow on the French network can be used to relieve hydro stations which can then conserve water. It can thus be seen that two different sets of circumstance may arise. One when all reservoirs in France are full to overflowing with spill power available, which will give coal

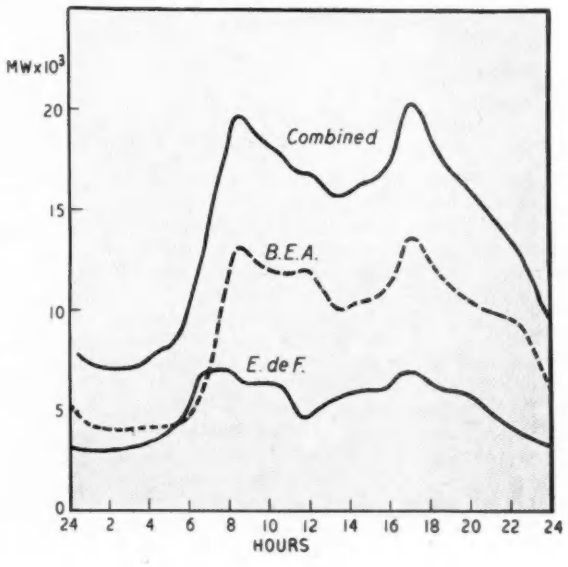


Fig. 1.—Load curves of the B.E.A. and Electricite de France systems, together with combined load curve, for the day of maximum combined demand in December, 1951.

— A review of the technical possibilities and the problems associated with this submarine cable project

saving both in France and Great Britain. The other when water power may be scarce but available on a short-term basis at the time of the British peak load, with the return of the energy at times which would enable water to be conserved in France. In either case considerable economies can be made.

Broad Basis of Scheme

Enough facts have been released for a partial picture of the tentative proposals to be built up, and for some possible further conclusions to be reached. It is understood that a voltage of 132 kV is favoured with four single-phase

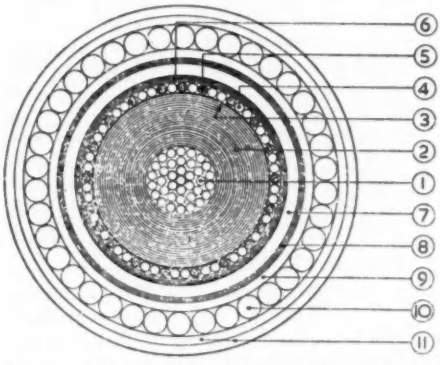


Fig. 2.—Section of cable as used in the Scheldt crossing (from C.I.G.R.E. Paper 221). 1, Conductor; 2, paper insulation; 3, metallised and perforated paper; 4, copper wires in second conductor; 5, paper cord as spacer; 6, secondary paper insulation; 7, lead sheath; 8, paper layers; 9, jute; 10, steel wire armouring; 11, jute serving

cables laid over the shortest route from Folkestone to a point on the French coast west of Calais. Three of the cables would be used for load carrying, the fourth being a spare. The maximum power flow through these cables would be in the neighbourhood of 100 MW. No doubt the larger amount of development required with higher voltage cables is an important factor in the choice of voltage. The development work will involve problems of cable design for submarine work, the difficulties of laying such long cables, and carrying out the necessary jointing and repairs at sea.

With three operating single-phase armoured cables, spaced a considerable distance apart, sheath losses, using conventional cables would be high. It may be, therefore, that in the cable design some technique similar to that adopted by the Dutch in the crossing of the River Scheldt with single-phase cables will be used. These cables, described by Messrs. Michielsen, Proos and de Zoetan at C.I.G.R.E., operate at 50 kV, carry 25 MVA and are some 3½ miles long. A section is shown in Fig. 2 from which it may be seen that a second concentric conductor is embodied inside the sheathing and armouring. This is connected to the lead sheath at each end of the crossing. The operating principle is to accept the fact that with a big axial distance between the cables, the total current in sheath and armouring will probably equal the current in the cores, and the only way of limiting these extra losses is to provide a high conductivity path for the induced current.

Operation

One of the major problems of operation would, of course, be that of synchronising the two countries in order to connect them together initially, and to hold synchronism once it has been attained. The synchronising would of necessity have to be carried out at 50 c/s, as it is most improbable that either country would deliberately lower their frequency to suit the other. It may also take some time, even in the event of the frequencies being similar, to pick up the appropriate phase angle. With the two countries in parallel a maximum power transfer of 100 MW would be so small in comparison with the size of the two systems that most delicate operational control would have to be exercised to prevent load swinging or loss of synchronism. A possible solution to ease this problem would be to isolate a section of south-east England from the main Grid system and to allow it to run tied to the French system—it may well be that some form of automatic control will also be necessary.

In a cable system of this length considerable capacitance would be involved and this would require compensation by means of reactors located at the terminal ends. Communication between the two systems would also be required, and this would probably take the form of laying a multicore pilot cable which can carry all necessary protection and operational information.

Conclusions

Some idea of the concept of the scheme and the difficulties involved have been given in the above notes. It should, however, be emphasised that although the scheme is approved in principle and is being actively pursued, it has not yet reached any degree of finality and that further investigations may result in the introduction of many modifications. Another point that should be borne in mind is that in the event of high voltage d.c. transmission becoming a practical proposition (from an economic and reliability viewpoint) the cables would, of course, be able to operate at much higher voltage without sheath loss, and the problems of synchronisation would automatically disappear.

MEASUREMENT RESEARCH

E.R.A. Reports Discuss Available Techniques

MEASUREMENT of copper losses in a transformer is, for small units, a simple matter. The usual method of short-circuiting the one winding and supplying the other with rated current is not, however, satisfactory in the case of transformers over 1 MVA in rating. With increasing size and reactance, the power factor of the short-circuited transformer becomes smaller, and the greatest care has to be taken if satisfactory measurements of input power are to be obtained.

In reactors and transformers of 30 MVA rating and over, stray losses due to eddy currents in the copper and flux linkages with the tank are most important. Measurement by wattmeters is still the predominant method, but it is doubtful whether the accuracy obtained in many cases is sufficient to enable the calculation of stray losses to be confirmed. With reactors the power factor may be so low that the wattmeter readings are too small to be of much use.

These difficulties are discussed in a report prepared for the E.R.A. by Mr. M. WATERS, B.SC., A.M.I.E.E. (Q/T122), in which the errors of ordinary wattmeters and the steps which should be taken to reduce these to a minimum are discussed. The conclusion is reached that for tests on transformers of all sizes, wattmeters of the low power factor type are the most generally useful instruments, and for accurate results they need to be used with instrument transformers of the highest quality.

For tests on transformers of high reactance or of very large size, wattmeters are likely to be inadequate, and consideration should be given to some form of null wattmeter or a.c. bridge circuit of the latter, the toroid bridge or mutual inductance bridge has been used in practice, and is likely to be available. The null wattmeter, although it has many advantages theoretically, has never been tried in practice for this purpose, and research would be required to explore its possibilities.

It is stated in the conclusion to the report that there has been little information published giving an experimental comparison between methods most useful for very low power factors. Such work would, it is suggested, be most useful.

It is fortunate that any defects in the waveform are not accentuated in tests on reactors or short-circuited transformers, and consequently the waveform of the testing machine need not be perfect. Problems associated with non-linear characteristics do not arise, and bridge circuits which are balanced upon the fundamental wave only give accurate results. The reason for this, is that the circuit is predominantly inductive and any slight harmonics in the voltage wave are largely suppressed in the current wave.

Capacitor Transformers

In a further report on capacitor transformers (Q/T122), Mr. S. SILVERMANN discusses design particulars and the problem of the capacitor transformer in general. The theory is derived for the case in which voltage-drop, phase-angle between primary and secondary voltages, and the influence of supply frequency variations on performance, are all to be considered. Effectively, this is the case where an instrument transformer is under consideration. As an appendix to the report, the results of tests carried out on power capacitor transformers on a laboratory scale are discussed.

Altogether 15 tests were carried out, the supply being obtained from a 3-phase 100 kVA transformer, 400/1,100 V. The loads applied were very small in comparison with this transformer capacity. Tests throughout produced results which coincided very well with the values obtained by calculation.

The transformer tested had capacitors of 0·1255 microfarad and 0·603 microfarads, while the inductance of the iron-cored compensating reactor was 13·8 henries at 1,000 V, and it had an ohmic resistance of 201 ohms.

Notes on Wiring by MEGOHM

Installation Economy

Ministry of Works Report Analysed

THE report published by the Ministry of Works entitled "Economy of Building Materials" gives some very useful information and Section 5 dealing with mechanical and electrical engineering is of particular interest to the electrical contracting industry. It is suggested that economy measures may be considered under three headings : (*a*) Plant and equipment designed by Ministry engineers. (*b*) Plant and equipment made to British Standards. (*c*) Raw materials, such as conduits, cables etc., used on installations.

For (*a*) the design work is usually on a high professional level and the need for economy is fully appreciated and applied. For (*b*) it is felt that it is neither practical nor desirable to produce substandard equipment, as British Standards in general have been combed down in recent years, while in the case of (*c*) significant economy in material it is suggested can be made by the use of alternative methods and cutting out extravagant provisions.

The recommendations made by practical and responsible engineers of the standing of Mr. J. Brierley, Mr. P. T. Fletcher and Colonel A. L. Hicks, O.B.E., representing the Air Ministry, Ministry of Works and the War Office respectively should do something to bring about a long overdue change in installation practice.

Economy Recommendations

To effect economies in the use of scarce materials for installation work it is suggested that this may be approached in two ways: (1) by revised design and methods of construction, and (2) by lowering of standards. I am in full support of (1) but I hesitate to agree to a lowering of standards unless it applies to a lowering of extravagant standards which has been the case in respect to the requirements detailed in some specifications issued for simple wiring work which have called for the use of 660 V v.r.i. cables, solid drawn galvanised conduits, copper conduits, heavy duty oil circuit-breakers and distribution equipment and separately wired circuits for socket outlets, etc. when satisfactory service could have been given by simple and sound alternative methods. Unnecessary expense can be incurred by insisting on the use of particular types of accessories etc. For example, specifying conduit unions and double pole switching when standard screwed conduit couplings and single pole switching would be quite satisfactory.

Standards as High

The use of new methods does not necessarily mean a lowering of standards and the wiring of premises for example by the use of t.r.s. or p.v.c. sheathed cables can be made a very sound job. I would not hesitate to adopt these systems of wiring in preference to the use of v.r.i. cables drawn into a light gauge conduit system. T.R.S. and p.v.c. sheathed cables can be successfully used as a concealed wiring system for new residential offices and stores premises and have much to offer providing the design and construction of the building is planned to accommodate these systems.

In the report stress is made that conduit should be used only where it is really necessary for technical reasons. It is interesting to read that consideration should be given to the use of grid suspension and similar systems in appropriate circumstances. Grid suspension is a catenary cable system which I described in my article "Catenary Cable Systems" in the "Electrical Times" on the May 1, and no doubt this system will in the future be more extensively used as it is most useful for wiring aircraft hangars, storage sheds, railway stations, garages, workshops and the like and is also satisfactory for external overhead distribution. It should also prove satisfactory in large generating stations for high level lighting.

There is little doubt considerable saving in steel and copper can be effected by the adoption of new systems. What is now wanted is direction with push and confidence to adopt new methods quickly and so save the use of steel which is one of our most valuable materials and anything that can be done to restrict its application and use on non-essential work is of vital national importance.

Electricity and Fire—1950

An Increasing Trend is arrested

WHEN the television service was first resumed after the war, a relatively large number of fires occurred due to faults in sets. One of the many items of electrical interest in the recent Stationery Office publication, "Fire Research—1951," is the statement that statistical returns for 1950 showed that the incidence of such fires had continued to decrease. There was evidence that changes in design during the last four or five years had substantially reduced this hazard.

In terms of actual figures, the rate of incidence of fires caused by television sets in the whole of the United Kingdom decreased during the four years 1947-50 from 6·4 to 2·1 per 10,000 sets at risk. There was a striking difference in the figures for the Sutton Coldfield (new sets only) and Alexandra Palace areas, the respective incidences for 1950 being 0·8 and 2·4 per 10,000. The comparative figures for wireless sets during 1950 was 0·28 outbreaks per 10,000 sets at risk.

Statistics for the more usual electrical causes of fire are given in the table. It will be seen that there were no significant changes in totals during 1950, and this itself had some meaning. Fires originating in electric cookers and refrigerators had been increasing fairly sharply since 1947, and the stabilisation revealed by the new statistics is very welcome.

A study of large fires occurring in the United Kingdom from 1944-50 showed that the average yearly loss was greatest for the group of manufacturers described as being engaged in the "manufacture of electrical installations, cables and apparatus." For this group there was an average of 4·7 fires every year which caused a loss of £10,000 or more, and the average yearly loss incurred was £304,000. The report of the Director of Fire Research points out that the precise significance of these figures cannot be estimated without information on the value of the property at risk.

Dust

Mention was made in the report for 1950 of the danger of fires caused by dust explosions in factories. Research into this problem has been carried out at the Safety in Mines Research Establishment, Buxton, and the explosivity of various samples of industrial dust have been determined. Another fire hazard that has been studied have been certain plastics (chlorinated methacrylate, polyvinyl chloride and polyvinyl chloride co-polymer) with reference to the danger of the evolution of toxic gases, in particular, phosgene.

CAUSES OF FIRES IN BUILDINGS

Supposed Cause of Fire	1948	1949	1950
Electric cooker ...	444	744	740
Electric fire, heater, radiator	893	900	1,092
Electric iron	356	436	372
Electric motor	280	180	264
Electric refrigerator	789	1,108	1,132
Electric wire and cable...	2,353	2,680	2,250
Wireless and television	365	444	450
Other electrical apparatus	540	736	906
Total current electricity	6,020	7,228	7,206
Static electricity ...	19	24	22
Miscellaneous and unknown	4,675	5,540	5,660
Total fires in buildings	37,246	42,792	43,744

Results of tests show that the concentration of hydrogen chloride and carbon monoxide when such plastics are burning is much greater than those considered safe for long exposures, but the concentration of phosgene is below the one hour limit.

Aids to Research

Amongst the general research described in the report is an investigation of the behaviour of wood and other cellulose materials when submitted to radiant heating. In this work an electrical analogue machine is proving most useful. The apparatus consists of a capacitor-resistor network in which potential represents temperature, resistance thermal resistivity and capacitance, specific thermal capacity. The time scale is such that 100 micro-seconds is equivalent to one hour in the thermal problem being solved. A c.r.o. display presents the heating curve through the material for inspection.

Attention has been given to the question of fire retardent fabrics, and in view of recent legislation, it is interesting to note the conclusions reached. These are to the effect that the best prospect of success in reducing the number of casualties due to personal clothing catching alight lies in the control of sources of ignition—e.g. guards for fires.

U.N.E.S.C.O. Forum on

EUROPE'S POWER SUPPLY

THE Committee on Electric Power of the United Nations Economic Commission for Europe has recently held its ninth session at Geneva, and a review of the main activities of the committee therefore seems opportune.

The purpose of the committee is to provide the governments of all the European countries with a forum where the various electric power problems of international concern can be studied and freely discussed, with a view to better co-ordination of national efforts for their solution.

The committee's method of working is simple: the secretariat prepares basic studies. Certain groups of experts may be convened to aid the secretariat in this task. The committee itself holds its plenary sessions annually. At these sessions, governmental delegates are often accompanied by representatives of national supply authorities and large private companies.

Typical Studies

The topics dealt with by the committee are extremely varied. Some are of a general character. Thus, one might cite as a first example a comprehensive analysis of the problem posed by the transfers of electric power across the frontiers of European countries, which has recently been prepared and will be published in the near future. This study analyses the factors which tend to favour or to impede these transfers. It brings to light the essential distinction between regularly scheduled transfers, which create an interdependence between two states, and occasional exports or exchanges of energy which have for their purpose to permit a more efficient use of national supply systems. In conclusion, the study shows the possibilities of these movements of energy in the future.

Each year the E.C.E. Secretariat publishes a study on the electric power situation in the different European countries. This permits a comparison of the trends of consumption and of measures taken to meet demand, including new connections across frontiers.

In the legal field the committee has given special attention to the difficulties arising from the hydro-electric development of rivers which either cross the frontier between two countries or which themselves form the frontier. In this latter case, a recommendation has been sent to governments urging them to facilitate common development. Having also observed that certain authorisation arrangements discouraged exchanges of electric power across frontiers, the committee recommended the adoption of greatly simplified procedures. These have already been applied in many countries.

The determination of the gross hydro-electric potential in European countries by a uniform method is another of the present activities of the committee.

Rural Electrification

The committee is now also tackling problems of rural electrification. The purpose of this inquiry is to bring out, in the light of the experience of highly electrified areas, the best method of achieving the electrification of an agricultural region. Four experts will meet in Geneva for two months, towards the end of this year, to analyse and evaluate national experience. Many European countries have already sent to Geneva national reports conforming to the plan for the final study. In addition, a seminar will be held early in November in which experts from 14 countries in Europe, Latin America, the Near East, the Middle East and the Far East are expected to participate. The national reports and the contacts which the seminar will permit will supply basic data for the work of the four experts.

General Topics

Other topics of a general character dealt with by the committee include: the study of economic aspects of pumped storage stations operating on a non-seasonal basis; comparison of construction costs of hydro-power plants; prospects opened up by technical progress in electric power production; the use of back-pressure plants; and basic trends and prospects in electric power consumption.

It occasionally happens, however, that at the request of particular countries, more specific topics are examined. Thus, the possibilities of electric power exchanges between Poland, Czechoslovakia, Bavaria and Austria have been examined in detail. At the present moment a

similar study is in progress concerning potentialities for the export of electric energy from Yugoslavia.

Apart from its work in connection with these studies, the secretariat holds itself at the disposal of governments to facilitate their agreement on specific problems. The secretariat has filled this role. Thus on a number of occasions negotiations were held under the auspices of the secretariat between the representatives of the Austrian and Yugoslav Governments to remove difficulties arising from the improvement and development of hydro-electric resources on the River Drava, which flows through the territories of the two countries.

Liaison

The committee, for the efficiency of its work, maintains close relations with the principal international organisations in its field. Under this arrangement, for example, the regular publication of statistics has been entrusted to the Union of Electric Energy Producers and Distributors (UNIPEDE). Further, the committee's work on legal problems has served as a basis for studies by the Council of Europe of possibilities for the eventual creation of "European companies."

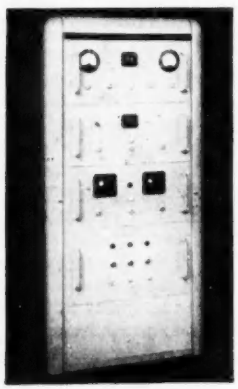
There is also contact with Latin America and Asia and the Far East through the United Nations economic commissions for those regions.

The committee, which during its first three years was under the chairmanship of M. Pierre Ailleret (France), is now under the chairmanship of M. Pierre Smits (Belgium). The general purpose and the diversified technical and economic interests of the ECE Committee on Electric Power, its composition and methods of work, its relations with other bodies, and its position within the framework of the United Nations, combine to make it a useful international forum and centre for the objective study of basic problems to whose solution all European countries can contribute and from which each and all stand to gain.

T.V. FOR BLIND AREAS

IN view of the forthcoming Radio Show, the opportunity was taken last Monday by E. K. Cole, Ltd., to hold a press visit to their Southend works. The principal item of attraction at this visit was the TV amplifier converter, an equipment for overcoming difficult fringe conditions.

The converter is intended to be installed at a suitable vantage point near the area to be covered, where it picks up the main television programme under the best possible conditions. It then re-transmits the sound and vision on a different frequency with a change of polarity thus providing good reception over an area of about 150 sq miles. The frequency change is carried out by "mixing" the incoming signal with an appropriate generated frequency and after amplification transmitting the resultant beat frequency. The shift in polarisation, from vertical to horizontal or vice versa, depending on the plane of the original wave, is introduced to provide additional discrimination between the main transmission and the auxiliary transmission provided by the converter.



Ekco's TV amplifier converter

The equipment has been working experimentally in Essex and has given a most satisfactory performance.

As the secondary transmission can be "beamed" by selecting the appropriate type of transmitting aerial its use for radiating programmes up valleys, or to towns lying below hills is obvious. The equipment itself can operate on any of the current line systems, and thus has great potentialities in the export market. Quality of the incoming signal is virtually unimpaired.

Little space is required for the actual apparatus, which is housed in one 4 ft high rack assembly and can be operated either by remote control or by time switches. The expense, too, is comparatively low, being about £3,000 for the installation.

It has been suggested that such secondary stations might well be established co-operatively by the wireless dealers in large townships, at present cut off from the main B.B.C. transmitters by hills or local topographical features, the only modification to the receiving sets being realignment for operation on the new frequency. It would, of course, in this country be necessary to obtain G.P.O. permission for such facilities to be established.

GARRISON DAM PROJECT

IRRIGATION
FLOOD CONTROL
POWER PRODUCTION
in large American scheme

KEY unit in the comprehensive plan for control and development of the water resources of the Missouri River basin (the Pick-Sloan Plan) is the large scheme now under way in North Dakota. This is the project, known as Garrison Dam, for which Ferranti, Ltd., were successful in obtaining the order for nine single-phase 37 MVA 275/13·2 kV transformers against American competition.

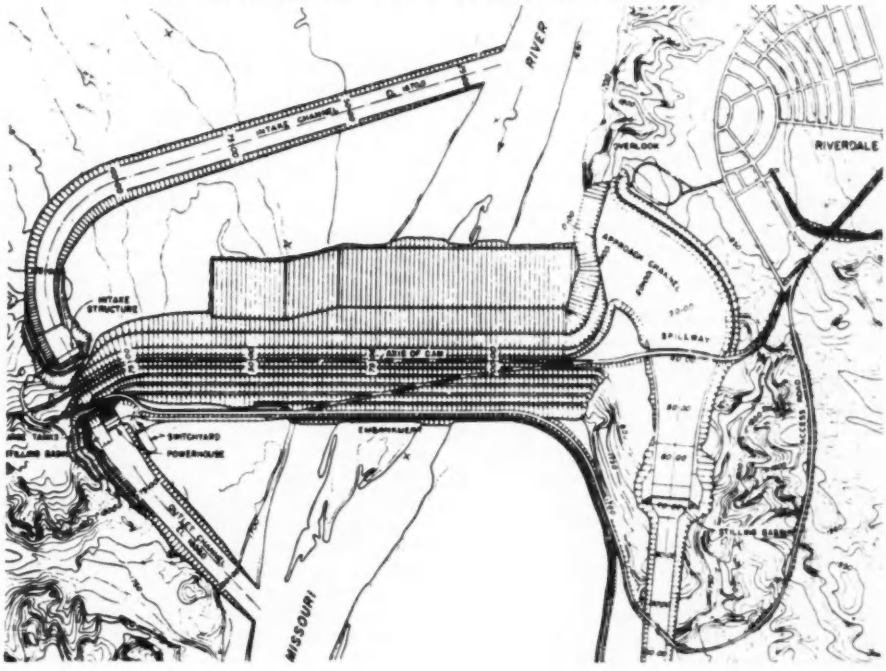
The project, authorized by the Flood Control Act of 1944 is one of a system of multiple purpose reservoirs being built by the Corps of Engineers and the Bureau of Reclamation to prevent the periodical disastrous floods which have occurred in the past in the main valley of the Missouri.

As more than one third of the drainage area of the river is above the site, the dam will actually control one third of the total volume of flow of the Missouri at its confluence at Saint Louis with the Mississippi.

Dam Construction

In its final form, Garrison Dam will be the largest rolled-fill earth embankment in the world, having a height of 200 ft above river bed and stretching some two miles across the valley. At one end will be a spillway capable of discharging over twice the volume of water ever recorded in a Missouri flood. This consists of 28 Taintercrest gates, each 29 ft by 40 ft, along the 6,444 ft long crest of the ogee-type concrete spillway. Controlled discharge from the spillway weir will flow along a 3,200 ft long chute into a stilling basin where most of the kinetic energy of the water will be dissipated.

General plan of the dam to show the roadways and the spillways



At the other end of the dam eight tunnels have been driven; five for the power station, with an inside diameter of 29 ft, and two 22 ft and one 26 ft tunnels for flood control, irrigation, etc.

The power station itself will be located below the downstream portals of the five power tunnels, and between the portals and the powerhouse there will be erected surge tanks to prevent sudden changes of pressure within the penstocks. Three generators, with a total capacity of 240 MW will be initially installed, but the ultimate capacity will be 400 MW in five units.

When the dam is fully completed (and work is in an advanced state) the reservoir so formed will have a maximum length of 200 miles, 14 miles wide at some places, with an area of 390,000 acres. Minimum pool dimensions are 120 miles long, area 133,000 acres.

Capacity of maximum normal pool is estimated at 23 million acre-ft of which 4½ million acre-ft will be available for flood control, 13·8 million for multiple purpose use and 4·9 million dead storage.

The dam itself will have an overall length of 12,000 ft, with a base width of 2,600 ft and a crest width, carrying a road of 60 ft. Volume of the earth fill is some 70 million cubic yards. Excavation work will amount to 86 million cubic yards, and concrete required is 1½ million cubic yards.

It is anticipated that behind the dam the muddy characteristics of the Missouri will disappear leaving a clear sparkling lake which will attract tourists and holiday makers. A study called the "Master Recreation Plan" is therefore being developed in order that the fullest advantage may be taken of the potentialities for out-door sports and for enjoyment of the scenic beauty of this man-made lake.

Wenvoe Operating on Medium Power

LAST of the chain of high-powered television transmitting stations being built by the B.B.C., Wenvoe in South Wales, went into regular operation on August 15. For the present, it will transmit on medium power until the high-power transmitters (built by E.M.I. and S.T. & C. Co.) are completed. The medium-power transmitters, which will be held as reserve on completion of the high-power units, have been built by Marconi's Wireless Telegraph Co., Ltd.

The vision transmitter will operate on a frequency of 66·75 Mc/s (4·495 metres) and the sound transmitter on 63·25 Mc/s (4·745 metres). Low-level modulation has been used on the vision transmitter, which has an output power of about 5 kW, the sound transmitter having an output power of 2 kW.

Ultimately, the Wenvoe station will receive its vision programmes over a coaxial cable from London, via Bristol and Cardiff, but until this cable has been completed, programmes will leave London on a cable circuit as far as the G.P.O research station at Dollis Hill. From there to Cardiff, they will travel over an experimental radio link installed by the Post Office, completing their journey to Wenvoe by cable. The sound programme will be transmitted over specially equalised G.P.O. telephone circuits, similar to those used for other B.B.C. transmitting stations.

Both mast and aerial system are generally similar to those already in use at Sutton Coldfield, Holme Moss, and Kirk o'Shotts. The supporting lattice-steel mast is 600 ft. high and triangular in section, each face being nine feet across. A cylindrical section, 110 ft high, and containing slots for possible v.h.f. sound broadcasting surmounts the lattice section, and a final 40 ft tower carries the combined sound and vision aerials. Taken in conjunction with the height of the terrain, the total height of the aerial above sea level is over 1,100 feet, an important factor in securing the greatest public service area.

The transmission line up to the aerial is similar to the one used at Kirk o'Shotts, and was developed by E.M.I. for the B.B.C. Reserve feeders, supplied by the Telegraph Construction and Maintenance Co., are of the semi air-spaced coaxial type with a solid central conductor of ¼ in. dia. copper wire, supported and insulated by a series of interlocking semi-cylindrical thimbles of Telcothene. The outer conductor is a seamless tube of aluminium formed by the Johnson and Phillips' process. The electrical uniformity of propagation characteristics is particularly good.

Power for operating the station is taken from the South Wales Electricity Board's system. Duplicate 500 kVA transformers fed from a 6,600 V feeder provide a supply of 415 V 3-phase 50 c/s. In addition, a 240 V single-phase stand-by supply is available to provide mast lighting and other essential services if the e.h.v. feeder has to be disconnected for maintenance purposes. Auxiliary wiring has been provided by W. T. Glover and Co. Ltd.

Problems and Practice IN ENGINEERING

Speedy Repairing

A SLIP-RING induction motor, rated at 580 h.p., 3-phase, 3·3 kV, developed an earth fault in the stator windings which, in the normal way, would have necessitated the fitting of a new coil.

The coils were diamond shaped with one coil-side taking up a half slot, and the earth fault occurred on the embedded portion of a lower half coil-side. In order to effect a replacement it would have been necessary to lift the upper halves of a number of coils to insert the lower half of a new coil, but, as the windings were baked hard, it was considered to be impracticable, if not impossible, to lift these coils and replace them without damage. The defective coil was simply cut away, pulled out of the slots and the connections bridged.

The stator had 216 coils with five conductors in series per coil (ten conductors per slot) and the cutting out of one coil thus reduced the conductors in one phase by 6·9%, but this procedure enabled the machine to be put back into service with less than twenty-four hours' delay and the out-of-balance current taken due to the unequal turns per phase was found to be negligible.—*S. Woodhouse.*

Plugging Switch Danger

THE impellor motor on a shot-blasting plant was fitted with a centrifugal switch operated plugging contactor, to obtain a quick stop. The centrifugal switch closed above a certain speed and opened below that speed before the rotor could reverse when being braked to stop.

The drive was by vee belts and pulleys, and during an inspection for belt tension by a millwright, the belts were pulled round, sufficient to close the centrifugal switch contacts causing the motor to start in the reverse direction, fortunately without causing any injury. The isolator of the controlling switch panel had not been opened as the millwright saw no danger when not working on live or moving parts. A large notice was afterwards fixed to the machine giving warning of this danger and of working on any part of the machine without opening the main isolator and removing the activating key.

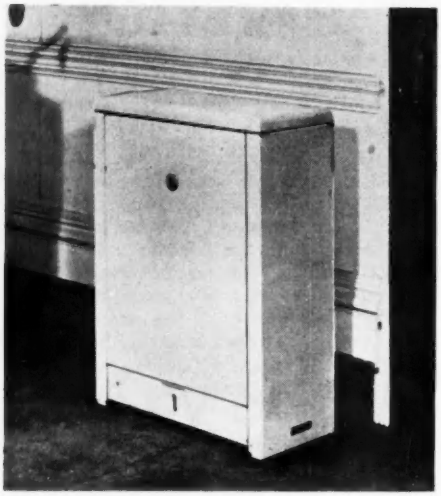
An alternative method of stopping which provides adjustment of the braking torque, but without danger of reversal, is to inject d.c. into the stator windings after switching off the a.c. If a d.c. supply is available it may be used through a dynamic braking resistance, but a more convenient method is from a rectifier connected via other switch contacts to two of the line terminals of the motor winding. When the lines to the motor are opened, the supply is at the same time connected to the rectifier and its d.c. output to the windings.—*T. H. Snelson.*

Imperfections of Lamp Testing

I WAS called to investigate the cause which led to the stoppage of an induction motor that had been running perfectly during the morning, and after the lunch break, would make no attempt to start.

Using a 60 W lamp and holder for testing the supply to the starter between each phase and earth, full brilliance was obtained with the lamp on all phases. Further checking of contacts in starter, Meggering cables to motor, etc., showed everything correct, also disconnecting cables at the motor terminal box and holding starting handle in star position, full brilliance on lamp was again obtained on all phases at the motor end of cables. This made it appear that the induction motor was faulty, but from Megger tests it was perfect. All testing of supply, so far, had been with a lamp between each phase to earth, and full brilliance obtained each time. Checking further, using a voltmeter at the main board, it was found that the reading was 230 V between phases and earth, and that voltage between phases was zero.

On investigating further, it was found that about 100 yards away from the consumer's premises, on the overhead l.t. line, a branch of a tree had fallen across the line, short-circuiting all phases, with a result red and yellow fuses blew first at a section point, and blue phase was still intact, causing a feed through the short circuit on all phases, therefore, on testing with a lamp at the main board, full brilliance was obtained, but this was actually the blue phase each time. As this was the only motor on the site, it was not obvious that the fault was located outside the consumer's installation.—*W. J. V. MacCorkell.*



Storage in *STONE*

Irish Designed domestic thermal-storage heater combines low capital cost and small dimensions with economy in operation

The 1.5 kW model C weighs 380 lb and retails at £14 17s. 6d. plus £8 6s. 2d. p.t., while the 1 kW model weighs 214 lb and retails at £13 13s. plus £7 13s. p.t. The units are manufactured in Ireland by the Aberdare Electric Co., Ltd., Finglas, Dublin, although it is understood production will be commenced in England in the near future.

THE principle of thermal storage heating is far from new, and indeed, has been applied with great success in many cases of large buildings. When, however, the problem of space heating in comparatively small rooms is considered, the conventional system becomes expensive. The Thermodare storage heater, however, combines low capital cost with small space occupation and is thus well suited for smaller duty. Basically, it consists of a solid block of refractory material of high specific heat and specific gravity. Heating elements are threaded through ducts and the whole is heat-insulated with suitable lagging and encased in sheet steel of robust mechanical design. A time switch connects the heating elements to the mains so that power is only being taken in off-peak periods.

In the 1½ kW Model C heater approximately one-third of the heat input is radiated during the eight-hour charging period, the remaining two thirds being stored and dissipated during the 16-hour discharge period. The actual radiation and temperature characteristics are shown by the curves. Two types of Model C are available, the 1.5 kW unit being 21 in. long by 11 in. broad by 30 in. high, and the 1 kW unit having a lesser height of 22 in.

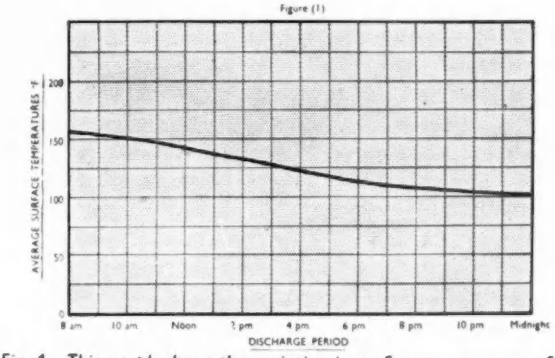


Fig. 1. This graph shows the variation in surface temperature of a Thermodare heater over a 16-hour discharge period. The actual variation in air temperature as recorded is somewhat less than this

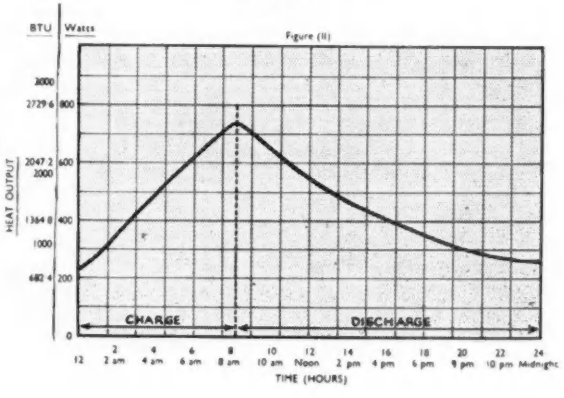


Fig. 2. The heat and energy cycle, right, covers the complete charge and discharge period

NATIONALISATION

Recent Books discuss Problems Solved and Created

NOW that the nationalised industries have had some time to consolidate their position, and to develop along lines laid down by the several Acts which brought them into being, the various problems associated with such large monopolistic concerns are coming into prominence, and their solutions are causing considerable trouble both to the theoreticians (on whose advice nationalisation was largely introduced) and to those responsible for day to day working and operation.

Some of these problems are discussed in a book* which consists of 14 essays together with a "summing up" by the editor, Professor W. A. Robson. As only to be expected, many of the essays cover similar points at issue and some repetition is thus introduced. Further, certain authors deal with past history such as the development of the public corporation, compensation terms, and the general historical background. On the whole, however, administrative and labour relations in particular are covered at considerable length, and the reader can see clearly many of the problems which were insufficiently appreciated by the original protagonists of nationalisation.

Management Structure

In particular the lack of attention paid to management structure below top board level when the nationalisation proposals were being formulated is emphasised by Mr. Austin Albu. He also discusses the merits and demerits of centralised control, contrasting the organisation of the public bodies with private concerns of large size such as I.C.I. and Lever Bros. Professor Robson, in his essay deals with the constitution of the governing boards, stressing the fact that such boards should consist only of the ablest people for the job and should not be a meeting place for the representatives of political or sectional interests. The vexed question of ministerial control is dealt with by Ernest Davis, M.P., who advocates a much wider use of the Ministers' existing powers, but admits that no satisfactory solution can be found. He does, however, suggest that Government and Opposition should consider their duty to the community and remove nationalised industries from the field of political controversy.

Labour and staff problems, particularly in the coal-mining industry, are the subject of Professor G. D. H. Cole's contribution. Here again, no solutions are propounded although several possible lines of approach are suggested, and the same is largely true of the essay by Mr. A. M. F. Palmer advocating joint consultation.

The Consumer

The essays so far mentioned have all been concerned with the internal workings of a nationalised industry. That most important person, the consumer, is then considered by Frank Milligan, who, on the whole, does not believe that the consumer's interest is well served by the present system of consultative councils. He emphasises, however, the anomaly whereby transport is subject to Government interference under public pressure, but other nationalised industries are largely free.

Possibly, the two most enlightening sections are those dealing with the assessment of efficiency of a nationalised body and the "Crux of Nationalisation." The first of these points out that no test known to private enterprise business can be applied to a monopolistic nationalised concern, and suggests that an outside body (the Monopolies Commission is proposed) should have powers to carry out an impartial investigation into the working of an industry whenever a price rise was suggested. The second by Sir Arthur Salter states tersely and effectively the main crucial problems economic, administrative and humanitarian, confronting the industries.

The summing-up, by Prof. Robson tends to turn toward classical socialistic concept of nationalisation and seeks to justify the end while admitting that many problems remain to be solved. On the whole, therefore, the reader will find that this book is more of a survey of the problems that exist than a plan for overcoming them.

The second book† on this subject that has recently come under our notice has been prepared as one of a series describing the history and present structure of individual nationalised industries. It gains in stature from the fact that its authors have no theory to prove. They are satisfied with presenting a very readable

*"*Problems of Nationalised Industry", edited by Professor W. A. Robson. Allen and Unwin, price 25s., and †"Electricity Supply in Great Britain," by Sir Henry Self and Elizabeth M. Watson. Allen and Unwin, price 20s.

account of the history of the supply industry up to 1947, and then rounding this off with a balanced account of the organisation adopted after the transition to national ownership.

Legislative Background

Inevitably, something has had to be sacrificed in the task of compressing such a full story into the modest bounds of the present publication. That something is the impact on the development of the industry of the continuing technical advance that accompanied its growth. However, the authors have made the choice purposely, and they offer an agreeably concise but complete story of the legislative background of the industry, and provide useful estimates of the constraint exercised by the acts concerned. When they turn to deal with the situation today, they content themselves with an efficient summary of the administrative form of the industry, and a reasonable statement of outstanding problems to be solved.

This last theme is developed in a chapter which relates the present status of the industry to experience overseas and to the needs of this country. The reliance of industry on electricity is well emphasised, and the point is discussed that the national interest will be gravely impaired if the advantages of a closely integrated programme of development has to be sacrificed to temporary national financial embarrassments.

All in all, this volume is an unreservedly welcome addition to the list of books on electrical supply and should serve a most valuable purpose in instructing both the interested general reader and the newcomer to the supply industry who wishes to know the basis on which present practice has been built.

Gas Recirculation in Boilers

ADVANTAGES of gas recirculation as a factor in controlling the steam temperature in boilers were recently discussed in an American Society of Mechanical Engineers paper*. In this it was stated that there was a well-defined trend towards the use of gas recirculation or burner positioning in conjunction with spray attemperation or gas bypass.

Advantages claimed for these techniques include reduction in the superheater and reheater surfaces, and relatively low leaving temperatures for furnace gases at full load. Reduced surface requirements bring many secondary advantages, and the less extensive attemperator requirements in reheat designs cause a welcome reduction in the total amount of high temperature alloy steels required.

Recirculation Technique

In gas recirculation a portion of the products of combustion are taken from a relatively cool temperature zone of the boiler (usually either the boiler or economiser outlet) and returned to the boiler in such a manner as not to interfere with the combustion process. The gas modifies the absorption of heat by the furnace walls through exercising a blanketing effect. As a consequence, more heat is available in the gases reaching the superheater surfaces. Moreover, more gas passes over the convection heating surfaces, and the heat transfer rate is in this way increased.

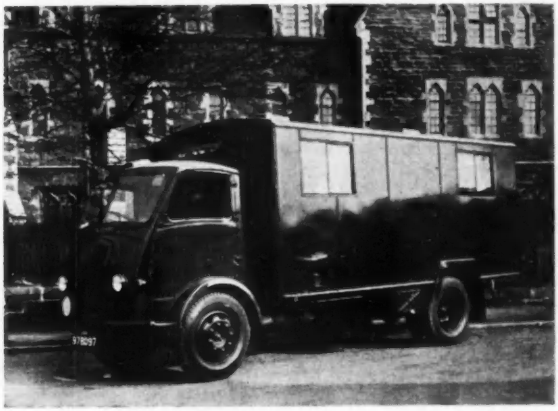
Reheat introduces further complication. With both reheater and superheater temperatures to be maintained constant, two attemperators may be necessary, and furnace gas temperatures may have to be undesirably high at full load. Gas recirculation or burner positioning cannot be used alone to control both reheater and superheat temperatures, because of different heat absorptions per pound of steam over the temperature control range. A solution is the use of attemperators or gas bypass to reduce the superheat temperature, with gas recirculation or burner positioning to control reheat temperature. With this arrangement maximum attemperation or gas bypass is at some partial load.

Many recent reheat boiler designs using gas recirculation have incorporated a "parallel flow" arrangement which combines the best features of gas recirculation and spray attemperation. In this arrangement the gases leaving the furnace pass across the secondary superheater and are then split into parallel flow streams for their passage across the reheater and primary superheater. Dampers control the relative proportion of gas flow.

In high temperature installations it is possible to recirculate gas at full load. This allows furnace exit gas temperatures to be maintained at a lower level than would otherwise be possible. Further, if the use of a number of reheat stages is developed in an attempt to increase theoretical Rankine cycle efficiencies, a variant of gas recirculation could again help avoid the need for excessive furnace exit gas temperatures.

**Paper by Mr. G. W. Kessler, summarised in the July 28 issue of "Electrical World."*

Lighting and fresh air in mobile Army Offices



With supplies connected this van is ready for use

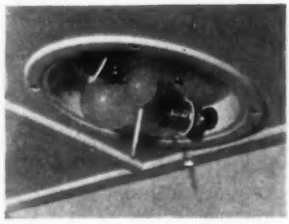
VENTILATION and lighting of mobile staff offices, recently delivered to the War Office, has been designed for complete independence, if necessary, of local supplies. In operation the 230 V supply will normally be taken from farmhouses or other buildings nearby but in emergency 12 V batteries carried with the office may be used or the supply derived from an auxiliary generator on a second truck.

Double Shell Construction

The office itself, a specially equipped 3-ton truck made by Morris Commercial Cars, Ltd., is constructed to withstand extremes of external temperature. This is achieved by a double wall, the exterior of steel and the interior of hardboard which gives an office size of approximately 15 ft 6 in. long by 7 ft 1 in. wide and 6 ft 3 in. high. When the office is in use, especially during blackout periods, extra ventilation is provided by a 7½ in. fan in the roof, extracting stale air.

Specifications for lighting required that not only should desks and tables be adequately lighted but that maps, etc., hung on the walls should be equally well illuminated. By providing six recessed fittings in the roof, each housing a 40 W Osram Pearl lamp, the General Electric Co., Ltd., who were responsible for both lighting and ventilation, have been able to largely overcome this difficulty. In addition, in each of the two fittings over the map boards is a 12 W pilot lamp for emergency use. Pearl coloured translucent "Perspex" bowls over the fittings are aimed to give an even diffused light over the whole office. Supplies for this equipment are taken in via terminal boards on the front exterior of the car, on which is provision for main power supply at 230 V, battery supply at 12 V, two field telephones, inter-office communication and radio remote control.

The roomy and well lit interior of the van is illustrated on the left



Above is seen one of the special lighting fittings. Note the centre stud for easy removal of cover

overseas news

More Uranium in Australia

Further uranium deposits in Australia have been discovered. One field in the Northern Territory is at Edith River, 100 miles south of the Rum Jungle site and 180 miles east of Darwin. The other is at Nichols Knob, 300 miles north of Adelaide, South Australia.

The Administrator of the Northern Territory has reserved an area of 392 square miles as a radio-active ore reserve round the Edith Field discovery which is incidentally close to the transportation facilities serving Rum Jungle.

Queensland Loan Success

A remarkable response from investors during closing hours last week announced by the Minister of Mines, Mr. Riordan, has resulted in the Queensland State Electricity Commission's second £500,000 loan at 4½% being over-subscribed.

Loan for Uranium

Dollars to the value of nearly £A4,000,000 should be loaned to the South Australian Government according to the recommendation of the United States Atomic Energy Commission.

The dollars would finance large-scale uranium production at Radium Hill in South Australia. It is understood that the loan would be made by the Export-Import Bank to the State Government. The loan would be used to increase mining at Radium Hill, build a treatment plant at Port Pirie and help construct a railway joining the two centres. At the same time Australia is contemplating another dollar loan to help develop the Rum Jungle uranium area in the Northern Territory.

Switch from Waterloo

Work on the new diesel generating station at Waterloo, N.S.W., has been suspended indefinitely, we understand.

Mr. Conde, of the Electricity Commission, speaking about the probable diversion of the four diesel sets destined for Waterloo to Canberra, the Federal capital, said that the power situation in the capital was acute. Decisions about the Waterloo plant would follow later.

Window Lighting "Pirates" in Dunedin

Closer watch on unauthorised lighting in city shops is being kept by Dunedin electrical department, inspectors having already warned several shopkeepers of contraventions of the rationing order.

Mr. G. T. Edgar, city electrical engineer, threatened continual offenders with disconnection during the permitted period 4.30 p.m. to the close of business for a period of three weeks.

Power saving in Dunedin since rationing was ordered by the State Hydro-Electric Board at the end of last month is satisfactory, daily demand having dropped from 35 MW to 30 MW.

Hold Up at Maraetai

Defects which have been discovered in some of the equipment for the Maraetai hydro-electric station on the Waikato River, New Zealand, may not affect the present schedule fixed to have part of the station operating at half head by October. From reports it seems that engineers have found flaws in the cylinders and pistons of the lifting gear which will control the flow of water to the turbines. An examination showed much faulty welding, according to Mr. W. S. Goosman, Minister of Works, but it is expected that most of the repairs will be made locally, although some new material may be air-freighted to New Zealand by the manufacturers.

Roxburgh take over Next Month

Holland Hannen and Cubitts, the British joint contractors with Conrad Zschokke of Switzerland, formally assume control of the construction of the Roxburgh hydro-electric scheme at the end of September, said the New Zealand Minister of Works, Mr. Goosman, in Wellington recently.

He said that the first overseas party was due to arrive before the end of August so that the transfer of responsibility could be effected without retarding progress on the scheme.

Restrictions not observed in S. Island

Forecast that unless South Island supply authorities observe more strictly their power allocation, storage at Lakes Tekapo and Pukaki will be exhausted by the middle of this month was made in Christchurch recently by district engineer W. H. Gregory.

Units generated each day totalled well over 3,200,000, whereas the amount ought to be 2,630,000 if supply authorities complied with the general manager's recent instructions that they must observe a demand 5% less than their 1951-52 allocation.

$32m Project for Pend Oreille River

The Consolidated Mining and Smelting Co. of Trail, British Columbia, has received permission from the International Joint Commission to construct a $32,000,000 hydro-electric station and associated dam on the Pend Oreille River.

This decision has been reached after 18 months of negotiations. When completed the dam will flood 2·7 acres of United States territory, when the water backs up one of the subsidiaries of the Canadian river.

60 MW from McArthur Falls?

Two new power projects planned for Manitoba to operate within the next four years have been considered by the State Legislature just recently. The first is the new hydro-electric station at McArthur Falls, last undeveloped site on the Winnipeg River. It will cost approximately $23,000,000 and should be on load by 1955. The second will be a $10,000,000 steam station in the western part of the province, probably near Brandon. It is probable, according to Premier Campbell, that this will be the first step in the province's expansion programme, although other alternatives were to be examined, one presumably a hydro station at White Mud Falls, on the Nelson River, to cost $100,000,000.

Tenders for McArthur Falls will be called as soon as possible to permit work to begin late this summer according to our latest information. $5,000,000 has been voted to the H.-E. Board as a start. Most of this is for McArthur Falls, although $700,000 has been set aside for the next project.

Tentative plans for the development of McArthur Falls make possible a capacity of 80,000 h.p. from a 23 ft head.

Regina Trams Go

The conversion to trolleybus operation of all tram routes in Regina has now been completed with the beginning of trolleybus operation along Forth Street East from Winnipeg Street to Lindsay Street. This route was served by trams until the depot was destroyed in 1949. Since then it had been operated by motor buses.

New Railway in Colombia

Final stages of negotiations for the proposed loan by the World Bank to Colombia have now been approached according to reports from Washington.

The proposed loan, which has been under study for some time, is to finance a railway in the Magdalena Valley of Colombia joining Buena Ventura, on the Pacific Coast with Bogota the capital. Engineers employed by the World Bank and Colombia State have also made studies of an administrative reorganisation of the Colombia railway system.

Power from the Wemmers?

Forty miles north-east of the city at a site on the Wemmers River, Capetown City Council is about to begin the construction of a large dam, 1,800 ft long and 180 ft high across the river to provide a new source of water supply.

The Board of Engineers responsible for this scheme have reported that it would be possible during normal times to develop 290 kW and during times of high water discharge from the river a total of 1,000 kW. However, the council had an obligation to store winter water for irrigation purposes. Of these amounts 150 kW would be required by the Council near the dam site.

At Steenbras, site of the present reservoir, a further 500-750 kW could be generated by installing turbines and generators at the break pressure tank.

However, it seems that as power available would be insignificant in relation to Capetown's requirements there would be little purpose in the schemes except to supply the Council's own requirements.

Electrolytic Copper From India

India will soon be producing electrolytic copper through a new process which has been developed for use in a silver refinery to be built near Calcutta at a cost of 10 million rupees and scheduled for completion in 18 months.

An Indian metallurgist, with the co-operation of a German firm who will supply and erect the new refining plant, has evolved this process.

Now that India is replacing her present coinage, which is an alloy 50% silver, 40% copper, 5% nickel and 5% zinc, by a nickel coinage the refinery will extract the silver and copper from these coins, of which a total of 600 million oz. was minted.

Cable Plant Contract

A contract for a complete cable processing and impregnating plant for a new cable works to be constructed in Serbia, has been placed with the General Engineering Co. (Radcliffe), Ltd., we learn. The contract has been signed in Belgrade by Mr. I. Lipman, of the British American and Eastern Co., on behalf of the Radcliffe concern. This contract was secured in the face of intense German competition. It is the second contract this firm has obtained from Yugoslavia within the last two months—the first being for a similar plant for treatment of transformers, apparently.

Fundres Project Finished Soon

Work on the hydro-electric project at Fundres, near Bolzano, Italy, which was planned and supervised by engineers of Italian State Railways and begun four years ago, is nearing completion. Annual output is expected to be some 50,000,000 kWh.

Plan to end Tokyo Power Shortage

2,505 MW is the target of the Tokyo Electric Power Co.'s five-year plan to end power shortages there.

Now in progress, this scheme is estimated to cost 215,788 million yen. At present total generation capacity of the company is 1,250 MW against m.d. of 1,800 MW.

New plant to be set up under the scheme will include 12 stations in the Tadami River area, with capacity of 900 MW; the 175 MW Tenryu River project; five stations in the Oi River area totalling 125 MW; and 46 others producing 840 MW in other areas.

There is, in addition, the 60 MW thermal power station due for construction in Edogawa Ward in the city.

PERSONALITIES

IN THE INDUSTRY

Three power station appointments have been announced by the London division of the B.E.A. **Mr. H. S. Holden,** A.M.I.E.E., previously deputy station superintendent at Deptford East Generating Station, has now been appointed station superintendent there. Commencing at Sheffield as an articled apprentice, Mr. Holden subsequently held positions at Clacton and Cardiff before coming to London with the London Power Co. in 1944. In 1946 he was appointed assistant superintendent at Stalybridge, returning to Deptford East Power Station in 1948. The new superintendent at Barking 'A' and 'B' Generating Stations is **Mr. S. C. Howton,** previously deputy superintendent at Fulham. After training at Folkestone, Mr. Howton was at Maidstone, Bermondsey, Hornsey and Brimsdown before going to the Lancashire Electric Power Co. He returned to London as charge engineer at Croydon and joined Fulham in 1938. **Mr. A. S. Price,** previously maintenance engineer (mechanical) at Barking 'A' and 'B' Generating Stations, has now been appointed station superintendent at Barking 'C' Generating Station. After a period at sea with Cunard White Star, Mr. Price was appointed combustion engineer at Southampton Generating Station in 1938, and in 1939 took up a position at Barking, and has since been continuously associated with that station.

Bill Switchgear, Ltd., have announced the appointment of **Mr. Norman Sharples** as their new representative in the north-eastern area. Mr. Sharples will cover the territory of Lincolnshire, Nottinghamshire, Northern Derbyshire and Southern Yorkshire.

Mr. Norman Sharples

We hear from the General Electric Co., Ltd., that **Mr. Beverly Pick,** the well-known industrial design consultant, has been appointed to advise on and prepare schemes where required, of decorative illuminations for the Coronation.

English Electric have made several new appointments in their publicity and press relations departments. **Mr. C. T. M. Bagnall** has taken the position of publicity manager in place of Mr. Peter Scott who recently resigned. The position of assistant publicity manager is filled by **Mr. M. B. Schroeder,** while **Mr. A. E. L. Jervis** has joined the department in London as trade and technical press officer. **Mr. John H. Lockett** remains the company's press relations officer, and he has been joined by **Miss Patricia Hardie** who, in addition to acting as Mr. Lockett's deputy, will deal specifically with the domestic appliance side of the company's business, as it relates to women's journals and women's organisations. The publicity department is now located at Marconi House, Strand, W.C.2. Temple Bar 1577.

Mr. Eric Dymond, A.M.I.E.E., A.M.I.Mech.E., A.F.R.Ae.S., who has for many years been associated with Sangamo Weston Ltd., has resigned his directorship of that firm.

Mr. T. E. Goldup, M.I.E.E., a director of Mullard Ltd., has been appointed chairman of the Board of Governors of the Ministry of Supply School of Electronics, Malvern, in succession to Professor

Mr. Eric Dymond

Mr. T. E. Goldup

Willis Jackson, D.Sc., D.Phil., M.I.E.E., Professor of Electrical Engineering, City and Guilds College, London. Mr. Goldup, who has been with the Mullard organisation for over 29 years, and was formerly a member of the research staff of Signal School, Portsmouth, brings with him a wide experience of technical education in the electronics field. His many activities include representation of the company on various committees of the Radio Industry Council. He also serves on certain committees of the British Standards Institution and other organisations connected with the electronics industry. In addition to being a governor of the Ministry of Supply School of Electronics since 1949, Mr. Goldup is a governor of the Wandsworth Technical College, and a member of the Advisory Committee of the Norwood Technical College. He is also a member of the Radio Research Board of the Department of Scientific and Industrial Research.

We learn that **Mr. Forbes Jackson,** M.I.E.E., M.I.Mech.E., who for some 19 years has been at the head of the London County Council's Electrical Division, has now been appointed deputy engineer-in-chief to the Council. Mr. Forbes Jackson

received his early training with Crompton and Co., and after a period with B.T.H. joined Merz and McLellan, serving both in their London office and in India. He has been prominent in the activities of the I.E.E., being chairman of the installations section for 1945-6, and representing the Institution on several committees. In 1949 he was president of the Batti-Wallahs' Society.

A visit to Bepco Canada, Ltd., will shortly be made by a party of representatives from each of the four British Constituent Companies. The members of the party will be **Mr. J. W. Rodger,** managing director, Bruce Peebles and Co., Ltd., and **Mr. A. K. Aitkenhead,** assistant secretary of that company, **Mr. D. E. Graham,** general sales manager, Overseas Division, Crompton Parkinson, Ltd., **Mr. R. W. Weekes,** managing director, The Harland Engineering Co., Ltd., and **Mr. D. C. Lorkin,** joint managing director of Lancashire Dynamo and Crypto, Ltd. The party will leave Liverpool together on September 16, but will return separately as at the conclusion of the Bepco visit, each representative has additional affairs to deal with whilst overseas.

Bruce Peebles and Co., Ltd., Edinburgh, announce that **Mr. P. Butler,** B.SC., M.I.E.E., and **Mr. W. B. Laing,** Assoc. Heriot-watt college, M.I.E.E., have been appointed directors of the Company, whilst retaining their status as joint general managers.

Mr. E. E. Faraday has resigned his position as chief theatre sales engineer with Messrs. W. J. Furse and Co., Ltd., of Nottingham, and has joined the lighting department of Messrs. Franco-British Electrical Co., Ltd. Mr. Faraday who is well known in lighting circles as a lecturer on stage lighting, was employed by Messrs. Holophane Ltd. for some years before the war. During the war years, he was engaged in the electrical research department of the Bristol Aeroplane Co., Ltd.

Mr. G. F. Freeman, M.SC., B.SC., M.I.E.E., A.M.I.Mech.E., at present the Head of the Electrical Engineering Department at the West Ham College of Technology, has been appointed Head of the Electrical Engineering Department at the Woolwich Polytechnic as from January 1, 1953. He succeeds **Mr. W. G. Spencer,** M.SC.Tech.(Manc.), M.I.E.E., A.M.C.T., who retires on September 15, 1952.

We learn that Veritys, Ltd., manufacturing electrical engineers, of Aston, Birmingham, have appointed **Mr. C. O. Innis,** managing director of Electrical and Allied Distributors, Co., Ltd., 31 Bruce Street, Belfast, as agent for the sale of Maxlume fittings in Northern Ireland.

Added to the I.E.S. Register of Lighting Engineers, which now includes 235 names, are Messrs. **P. G. Goulding** (London), **D. McPherson** (Paisley) and **L. S. Hyatt** (Sydney, Australia).

Newly appointed transformer engineer in the Transmission Design branch at B.E.A. headquarters is **Mr. G. B. Harper,** A.M.I.E.E. Mr. Harper received his early training with the Electric Construction Co., and after war service with R.A.O.C. and R.E.M.E. was for some years with Messrs. Bruce Peebles of Edinburgh. He joined the B.E.A. in 1949, as assistant to Mr. Flux, who resigned earlier this year to take up a senior position with Bruce Peebles.

Mr. F. Latour, a member of the firm of Maclaine, Watson and Co. Ltd., of Djakarta, Indonesia, distributors for Hoover products throughout Indonesia, has recently undertaken a course of instruction in every phase of Hoover distribution and service at the establishments of Hoover Ltd. in Britain.

His visit followed that of **Mr. H. E. Duggans,**

Mr. F. Latour, right, examines the mechanism of a cleaner with Mr. H. E. Duggans

Hoover Far Eastern export divisional manager, who, when he saw Mr. Latour in Indonesia, invited him to study Hoover affairs in this country during a visit he was planning to Europe. Mr. Latour is seen in the picture (*right*) studying the sales demonstration of a Hoover cleaner under the supervision of Mr. H. E. Duggans.

In regard to our note last week concerning the appointment of **Mr. L. C. Parker** as district commercial engineer for the Boston district of the East Midlands Electricity Board, it seems that the note may be rather misleading. The district is a large one, covering some 550 square miles, and, being previously operated by two companies, it was found desirable to divide the duties until reorganisation of the district was complete. Mr. Parker, who has now taken over as commercial engineer, operates from the district office at Boston. Since nationalisation he has been assistant commercial engineer for the northern section of the district, and **Mr. J. H. Fairhead,** whose resignation we also reported, occupied a similar post in the southern section.

Following the appointment of **Mr. F. N. Pardow** as manager of the Manchester branch of the Simplex Electric Co. Ltd., in succession to **Mr. W. C. Sherry** who recently retired after 32 years' service, the Simplex Co. now announce that **Mr. W. Clegg,** who has been with the firm for many years, has

been appointed assistant branch manager at the Manchester branch.

As a result of movements of personnel within the Civil Service, the two parts of the coal division of the Ministry of Fuel and Power are being merged as from September 8 next, under the charge of **Mr. R. Kelf-Cohen,** C.B., who has previously been at the head of the Ministry's gas division. **Mr. C. H. S. de Peyer** has been seconded for special duties elsewhere, and **Mr. I. McM. Forsyth,** C.B., is due to retire.

Principal officers have been elected for the South Western Sub-centre of the Institution of Electrical Engineers. Chairman is **Mr. R. H. Cotton,** A.M.I.E.E.; past chairman, **Mr. S. G. Mark,** M.SC.(ENG.), B.SC., M.I.E.E.; first and second chairmen are **Messrs. H. Trussler,** A.M.I.E.E., and **J. E. Flower,** M.I.E.E. respectively. **Mr. G. B. Devey,** A.M.I.E.E., is Hon. Secretary; **Mr. W. J. Oxenham,** M.I.E.E., Hon. Treasurer; and **Mr. N. Axford,** B.SC.(ENG.), M.I.E.E., is Asst. Hon. Secretary.

OBITUARY

It is with regret that we have to announce the death of **Mr. Kenneth Alexander Scott-Moncrieff,** M.I.E.E. Born at Dalkeith, Scotland, in 1868, Mr. Scott-Moncrieff was educated at George Watson's College and the Heriot-Watt College, Edinburgh. He was apprenticed to Crompton and Co., Chelmsford, and from then on had a distinguished career in the electrical world. In 1889, he was resident engineer of the Southend Pier Electric Tramway Co., and from 1891-3 engineer to the Southampton Electric Light and Power Co. From 1897 to 1901, he held the position of chief engineer in the Calcutta Electric Supply Corporation, and was largely responsible for the introduction of electricity into that city. From 1904 to 1934, he was chief engineer of the Electric Supply Corporation, Ltd. He was also past chairman of the Provincial Electric Supply Association, the British India Electricity Committee, the Electric Supply Corporation, the Hendon Electric Supply Co., the Cawnpore Electric Supply Corporation, the Delhi Electric Supply and Traction Co., the Madras Electric Supply Corporation and Madras Tramways, Ltd. In addition, he was a past director of North Met Electric Power Co. and the East African Power and Lighting Co.

Captain George Merrick, who died recently at the age of 62, was formerly general manager of the Llanelly and Gorseinon Electric Supply Companies and of the Carmarthen Bay Power Co. In recent years he had been living in retirement at Dymchurch, Kent.

Mr. J. F. Urquhart, B.SC., A.M.I.E.E., deputy manager of the North of Scotland H.-E. Board's South Caledonia area, died suddenly last week. He was 48 years of age.

NEW LITERATURE

Fundamentals of Technical Electricity

by H. G. Mitchell, M.A., B.SC.

AMONGST the many textbooks that appear covering the general principles of electrical science, there are few that can be recommended both as an aid to learning and a reference volume during subsequent practice. This compact volume by Mr. Mitchell is an exception that is the more welcome for its reasonable price. The author covers succinctly the usual field of electrotechnics, with a particularly clear and practical approach to measurement techniques. There is a treatment of alternating current circuit theory both from the vector and j-notation approaches. Further chapters give short introductions to electronics and to electrical machines.

One of the outstanding impressions the book gives is that it is up to date. This is apparent in the text, and even more so in the excellent illustrations which back it up. There can be no hesitation in recommending this volume both to the National Certificate and C. and G. students for whom it is specifically intended, and to others requiring a sound introduction to electrical engineering. Published by Methuen, 543 pages, 7¼ in. by 5⅛in. Price 18s.

Modern Wiring Practice

by W. E. Steward, ASSOC. I.E.E.

FIRMLY based upon the requirements of the I.E.E.'s "Regulations for the Electrical Equipment of Buildings" which are interpreted through the author's wide experience of installation practice, this volume should be of the greatest value to electricians and apprentices. Good installation is very much a matter of attention to detail, and few books that we have seen show so clear an exposition on points of detail as this.

Wiring regulations are discussed in the first chapter, with some consideration of the calculations involved in their application. Next is described the general principles of installation in buildings, with special attention to final subcircuits. An overall survey of installation methods then leads to detailed consideration of each of the more common wiring systems. Finally come chapters on temporary installations, fittings and accessories, earthing, and testing. Throughout the "text" there is cross-referencing to I.E.E. Regulations, and the points made are developed in well chosen and presented illustrations. Published by George Newnes, 228 pages, 9 in. by 6 in. Price 17s. 6d.

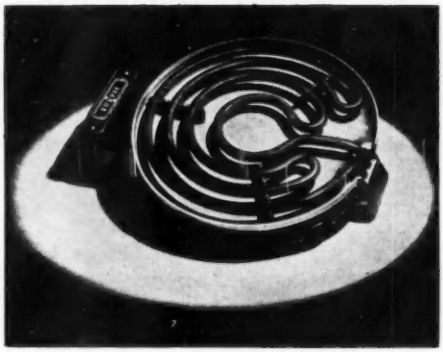
The BUYER'S *Column*

New One-Circuit Boiler Plate

A USEFUL addition to electrical cooking equipment is provided by a new "Sunvic" one-circuit radiant boiling plate. Made by SUNVIC CONTROLS LTD., 132/135 Long Acre, W.C.2, this plate is designed for use with their well-known "Simmerstat" control, to give economical service.

Low thermal capacity, aimed at ensuring minimum heating time, enables the plate to respond instantly to thermostatic control. Heat is transferred to the utensil by both convection and conduction direct from the element, and an aluminium reflector plate minimises wastage. In two sizes, 6½ in. and 8 in. dia., the plate can be supplied by itself or with support and cradle.

This is the Sunvic Type EDA Interchangeable pattern hotplate



Fuse Units for Panel Mounting

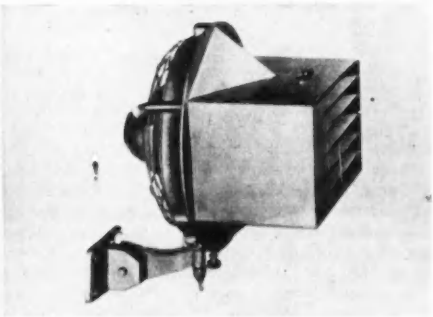
RECENT addition to the extensive range of distribution equipment manufactured by W. T. HENLEY'S Telegraph Works Ltd., 51 Hatton Garden, London, E.C.1, is a fuse unit for panel mounting designed to accommodate cartridge fuse links up to 60 amp rating. The units are supplied unmounted complete with stems and nuts, but without cable sockets or fuse-links. Box and fuse carrier extend 3 1/16 in. from the panel, and are 3⅛ in. in length overall.

Floodlighting for the Coronation

TO meet the anticipated demand for floodlighting equipment consequent upon coronation celebrations next year, SIMPLEX ELECTRIC CO., LTD, Broadwell, Oldbury, Birmingham, have made available their Simplex "Fiesta-Flood" for many types of floodlighting.

Construction is of Silvex finished aluminium; the convex heat-resisting glass being sealed to the body by a rubber gasket, to provide complete weatherproofing. The glass itself may be quickly removed, being held in place by a retaining ring and screw. Both body and reflector are in one piece. The provision of a rubber spout cable outlet and a short length of three core T.R.S. cable is aimed at ensuring maximum flexibility for mounting to a ¾-in. male conduit stem. Medium beam spread of 20° to 40° is obtained with 300 to 500 W General Service and 250 W MBT/U Blended lamps and using the 500 W Class B2 Projector lamp gives a narrower beam of 15° to 20° spread. With plain glass covers the market price of the Fiesta-Flood is 82s. 6d., and covers in red, blue, green and amber may be supplied at an additional cost of 6s. each.

The Kaloric fan heater for quick space heating



The Kaloric Fanheater

SUPPLEMENTING their range of convector and unit heaters, M. AND J. LOSSOS AND CO., LTD., 31 Beethoven Street, W.10, have recently developed a "Kaloric" 3 kW Electric Unit heater for industrial or commercial use. Designed for wall mounting this fan heater operates on single phase a.c. supplies.

Presenting an attractive appearance in beige enamel, the casing is constructed from sheet steel and houses special heater elements working at black heat. Thermal cutouts prevent overheating and can be reset by push-button control. Moreover, for summer months, the heater may be disconnected so that the unit operates as a ventilator. Swivel adjustments on the mounting permit a swing of 120° horizontally and 30° vertically to provide variation in air flow direction and consequent economy of heating. Marketed at £13 10s. the heater is now in full production and is available for early delivery.

New Rotary Switch by Diamond H

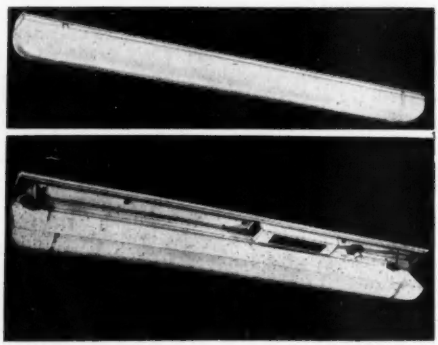
ADDING to their range of switchgear "DIAMOND H" SWITCHES, LTD., Gunnersbury Avenue, W.4, announce the recent introduction of a new heavy duty Rotary Packet Switch which they claim is offered at competitive prices. A measure of its heavy duty capabilities is shown by its rating—30A at 250 V a.c./d.c. or 17A at 440 V. In addition, special features are incorporated which are aimed to ensure a long mechanical and electrical life. Two types, for either base or panel mounting can be supplied and delivery time is from three to four weeks.

Diamond H rotary packet switch for heavy duty

Fluorescents from Crompton

NEW designs recently added to the Crompton range of lighting fittings are the "Abbey" and the "Alton." The former is a louvred model intended for use where comfortably diffused general illumination is required in addition to a pronounced downward direct light. A feature of the design is the absence of screws or catches holding side panels and louvre frames, maintenance being thus facilitated. The other fitting is the "Alton," shown in the illustration. In this white opal Perspex is used as the diffusing medium. The "Abbey" takes two 80 W 5 ft lamps, and the "Alton" one similar tube. Full details of these introductions are obtainable from CROMPTON PARKINSON, LTD., Crompton House, Aldwych, London W.C.2.

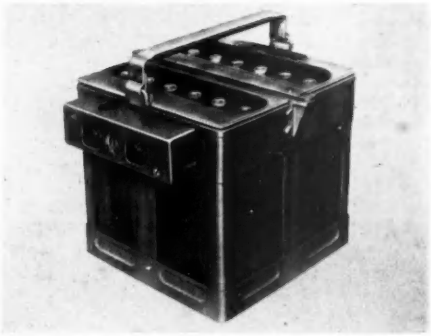
The shade of the Alton fitting hinges downwards for easy access



Battery Turns Jets

AIRCRAFT engine starting duties require batteries built to a specially stringent specification, and it is typical of the latest model to be developed by OLDHAM & SON, LTD., Denton, Manchester, that all its components will handle comfortably currents of 1,000 amps. Nominally rated at 24 V, 40 Ah at a 10-hour rate, the battery has been developed under Ministry of Supply contract for starting large aircraft engines. It is fitted with the makers' patent "Fibrak" low resistance separators, and is unspillable up to angles of 60° with the vertical, under conditions equivalent to flight at 50,000 ft. Cell containers and lids are moulded in a special high-impact grade of polystyrene, giving visual level indications and individual cells are assembled in a cushioned light-metal framework.

Oldham's new battery is for large engines



Smaller Capacitors

COMPACTNESS is one of the features of a new capacitor in which is used a paper dielectric impregnated with "Permitol." Introducing this type for the first time in the United Kingdom, the manufacturers, BRITISH THOMSON-HOUSTON CO., LTD., Crown House, Aldwych, W.C.2. hope to use this material in all their future capacitors.

Excellent insulating properties and a high dielectric constant claimed for "Permitol," effect the reduction in size. In addition its usefulness is enhanced by chemical stability and non-inflammability. B.T.H. capacitors of this type now being introduced are housed in an all-welded aluminium case fitted with clamp type terminals to facilitate wiring and incorporate a discharge resistor. They are suited for operation at ambient temperatures of about 70° C, and can consequently be used to advantage in fluorescent tube equipment.

A P.L. II Capacitor

Replacing the PJ type, the new range will be known as the PL type, of which the first is PL.11, shown in the accompanying illustration.

Lamps in Ones, Twos or Threes

ATTEMPTING to assist the retailer, PHILIPS ELECTRICAL LTD., Century House, Shaftesbury Avenue, W.C.2, have produced a "One-Two-Three" rack for their "Argenta" range of electric light lamps. By this packing, handling the lamps from factory to retailer should be made simpler and moreover it is claimed that breakdown of packages into smaller units will be made much easier for all concerned in distribution.

The new packing consists simply of wrapping each lamp in a corrugated cardboard sleeve of square section which is then packed into corrugated outers holding two or three sleeves. Thus, whilst retaining the advantage of a multiple pack, this method still allows the retailer to sell separately packed single bulbs. Philips' well-known waves and stars motif is incorporated into the design which, in blue and orange, is printed on the covers of both sleeve and outer pack. In addition, on one side of the outer is found a chart of recommended lamp sizes. This pack will be available from September 1.

Cooking with Economy

New G.E.C. Cooker Combines low price with high efficiency

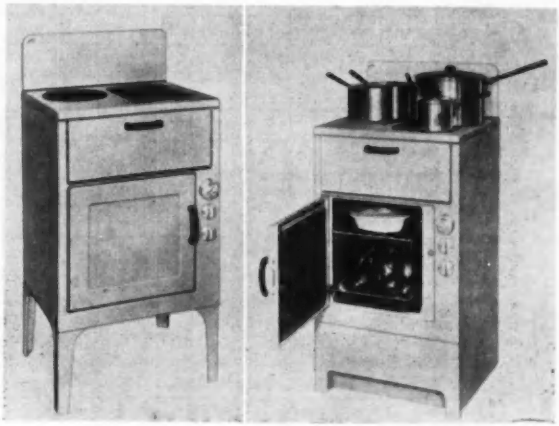
KNOWN as the DC452, a new G.E.C. cooker has facilities for the requirements of a family of five persons. This modern styled easy-to-clean kitchen requirement has an acid-resisting porcelain enamel finish, and will meet the needs of housing estates and the purchase schemes of electricity boards.

The large oven space, sufficient for cooking a 21 lb. turkey, is fitted with panel elements designed to give efficient heat distribution and economy in consumption of electricity. The oven, which has a side-opening door, is fitted with a G.E.C. "Ovenmaster" automatic temperature control. There is no after-the-meal drudgery in cleaning grease out of awkward corners, since the oven interior is easily removable in three pieces.

The hob equipment comprises one 8 in. boiling plate and a grill-boiler measuring 10½ in. by 8 in. The latter is the most useful and economical part of the cooker for cooking meals. Three or four pans can be accommodated on the grill boiler at one time. With the deflector plate in position the grilling compartment is useful for keeping plates warm. Both the boiling plate and grill-boiler are fitted with three-heat control switches and are constructed according to the E.D.A. interchangeability specification. Simmer-control can be provided for the 8-in. boiling plate as an optional extra.

The cooker is available either on legs (DC452) or on a plinth (DC453) and is supplied in a light mottled grey colour, though the plinth model is also available in green and cream at a slight extra charge. Every cooker is furnished with a grill pan, grill grid, deflector plate, oven pan, splashguard, cookery book and instruction card. Overall dimensions of the cooker are 21 in. wide, 17 in. deep, and 43¾ in. high. Nett oven cooking space is 12⅜ in. wide by 14¼ in. deep by 13½ in. high.

Price of the two-plate domestic cooker on legs (DC452) is £24 10s. 0d., and on a plinth (DC453) £25 10s. 0d. It is claimed that this cooker with a total loading of 6·05 kW will cook for a family of five at an estimated cost of one unit per head daily, allowing for breakfast, dinner, tea and supper.



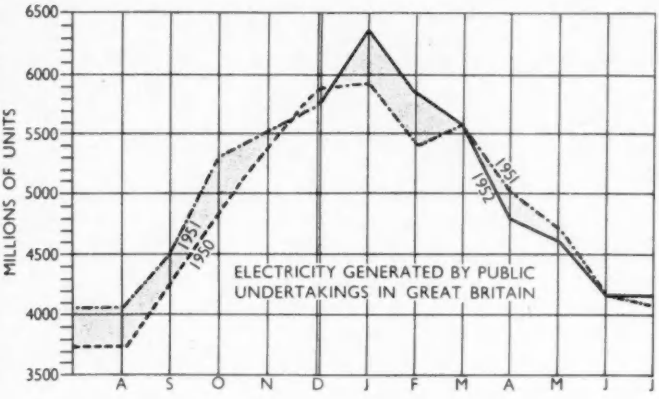
The DC452 cooker and its plinth-mounted counterpart DC453 afford ample facilities for catering for a family of five

UNITS GENERATED

4,145 million units was the total generated during July in stations under the control of the B.E.A., the North of Scotland H.E. Board, and the Lochaber Power Co. The corresponding figure last year was 4,057 million units, so there has been an increase of 2·2% over the twelve months.

Of the total, 4,034 million units was generated in steam stations and 100 million units in hydro-electric.

Energy sent out during the months was 3,891 million units, 93·9% of that generated. This gives the total for the year so far as 33,397 million units, showing an increase of 1·5% on the first seven months of last year.



POWER SUPPLY IN JULY

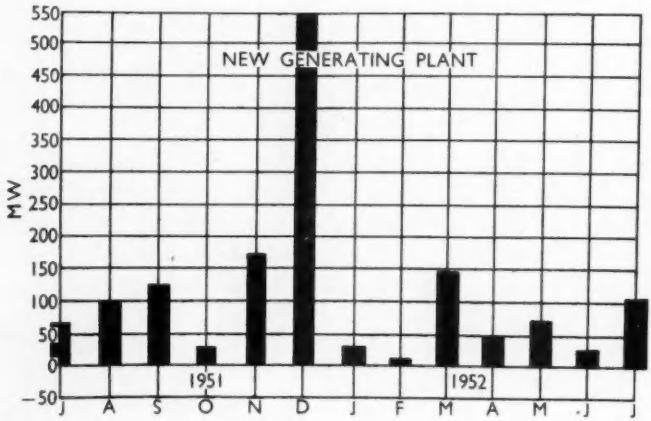
ALTHOUGH work was well advanced in many B.E.A. stations on new plant, only two reported actual commissionings during the month of July. One of these was North Tees C at Middlesbrough (North-Eastern Division), where a second 60 MW Parsons turbo-alternator was brought into operation. Four such sets are so far planned for this station. In the South-Western Division, a second boiler was commissioned at the Plymouth B station. This is a 320 klb/hr Yarrow design, supplying 31 5 MW sets at 600 lb/sq in., 850° F.

So far this year 11 sets have been installed in B.E.A. stations, with a total capacity of 484·5 MW. This compares with eight sets and 308·5 MW in the same period of 1951. For boilers this year, the figures are 23 units and 6,550 klb/hr evaporating capacity; in 1951 they covered 23 boilers with an aggregate evaporating capacity of 5,990 klb/hr.

For the first time since February, the total energy generated exceeded the corresponding amount for the same month of 1951. Although the change was relatively small in degree—2·2%—it could not have been entirely due to the weather, which was on average a few degrees warmer in July this year than in 1951.

Water Power

One section of the generating statistics which does show a sharp rise on last year is that relating to water power. 100 m units were generated by water-driven turbo-alternators in July, against 74 m last year, and altogether 983 m units had been generated by this means in 1952 up to July 31. The corresponding total at the same time last year was 795 m.



GENERATING PLANT

At the end of July, 1952, the installed capacity of the B.E.A. was 16,100 MW, showing an increase of 108 MW during the month. During this same period the North of Scotland total stayed constant at 644 MW. The month's commissioning figures bring the overall increase during the past twelve months to 1,380 MW, or 9·0% of the July, 1951, total.

The total installed capacity used for the purposes of this graph should be distinguished from the output capacity. The installed capacity is the total m.c.r. of all the generating sets which are connected on both steam (if appropriate) and electric sides and are suitable for service.

The WEEK in NEWS

£2 WAGE CLAIM IN ABEYANCE FOR FURTHER TALKS

THE claim for a wage increase of £2 a week initiated by the Amalgamated Engineering Union has been temporarily suspended. Following the employers' flat refusal to consider such a claim there was a risk that serious developments may have been forthcoming at the annual conference of the Confederation of Shipbuilding and Engineering Unions. The executive committee's emergency resolution proposing new talks with employers was, however, approved unanimously, and a conference of union executives will take place on September 10 to hear results.

Board Sends Quick Help to Lynmouth

THE floods in the Lynton and Lynmouth area have shocked the country. Not least among the sufferers was the S. Western Electricity Board who, despite damage to their premises and equipment, immediately set about restoring supplies to the stricken towns. Staff were drafted at once to Lynton to take emergency supplies of power and lighting.

Parts of the resorts were supplied by Lynmouth power station, the roof of which collapsed in the floods. The leat conveying water to the hydro plant was washed away and diesel plant flooded. A 33 kV line operating at 11 kV had provided power supply. The old station provided a non-standard supply of 100/200 V at 100 c/s, and consequently the whole of Lynton was changed to the new supply operating at 50 c/s. The programme for standardisation and reinforcement was therefore accelerated.

Midlands' Problem of Power Costs

Warwick refuses to install Circuits for Cookers

A FORTNIGHT ago we reported the recommendation of Dudley's Housing Committee concerning the provision of facilities for the use of electric cookers in new council houses if tenants so desired. The recommendation was made at the suggestion of the Midlands Electricity Board, whose anxiety over the low consumption on council estates is most apparent. Whereas the Midlands Board's request received favourable replies from Dudley and elsewhere, the adjoining East Midlands Board has been confronted by a decision of Warwick's Housing Committee not to install circuits for cookers in new houses.

The Council do not object to electric cookers being fitted, but tenants are required to pay for the installation of the circuit. It is understood that the decision of the Housing Committee was based on economy. There was the greatest difficulty in keeping the cost of houses down and not to provide circuits for cookers was but one of the economies made.

The Board has endeavoured to explain the apparent paradox resulting from appeals to economise in peak periods and requests for increased consumption at other times. If electricity was to continue to be as cheap, the Board stated, it had to be used extensively. In order to supply electricity economically to housing estates, the use of cookers and heaters in the homes was essential.

Ayr Trade Fair

PART of Ayr's celebration of 750 years as a Royal Burgh took the form of a Trade Fair organised by the town's Chamber of Commerce. Among exhibitors were the S.W. Scotland Electricity Board, who departed a little from the usual run of displays to feature gifts for holiday-makers to take home. On view was a large range of modestly priced electrical gadgets.

Also prominent at the Fair was the local electrical firm of John Girvan and Sons. Emphasis of this display was on lighting, but the company showed a most comprehensive range of goods, including cookers, washing machines, refrigerators, heaters and milking equipment.

The First Half-Century

Mr. J. E. Waller's recent address to the Liverpool Chamber of Commerce deals with a subject of which we are bound to hear more in the near future. To be correct one should say two subjects: for his text was "Through Traffic on Tramways for Passengers and Goods." The idea of through traffic for passengers is already familiar, it is practised on a small scale on some of our tramway systems, though our efforts in this direction are quite rudimentary as compared with Continental and American practice; but goods traffic on tramways, to say nothing of through traffic over linked networks, is still little more than a phrase. The word "goods" is used here in the railway sense as implying more or less heavy merchandise, not merely parcels. —*From our issue of August* 21, 1902.

MINISTRIES REMOVE ZINC RESTRICTIONS

IT was announced on Friday by the Ministry of Supply and the Board of Trade that restrictions on the use of zinc have been abolished. This step has been made possible by the continued improvement in supplies of this metal. Accordingly, the Copper and Zinc (Prohibited Uses) Orders which imposed restrictions in the manufacture of a large number of commodities are being amended so that future control will apply to copper and copper-based alloys only. Amendments came into effect yesterday (Wednesday).

The announcement stated that administrative arrangements which restrict the use of zinc for galvanising iron and steel sheet, wire, wire products and tubes have been removed as from August 15. Licences will be needed to acquire virgin zinc but the allocation system will be discontinued. Copper, of course, remains controlled.

OFFICIAL PUBLICATIONS

FIRE RESEARCH BOARD H.M.S.O., 2s. *Report of D.S.I.R. Board with report of Director of Fire Research for* 1951 (*see page* 314).

EXPORT LICENCES IN RESPECT OF ALUMINIUM, COPPER AND IRON AND STEEL GOODS. *Open general export licences issued by Board of Trade*. H.M.S.O., 2d. each.

E.R.A. REPORTS. Q/T122, *Design of Capacitor-Transformers*,, by S. Silbermann, *price* 24s. 4d. Q/T129, *Measurement of Copper Losses in Transformers and Reactors*, by M. Waters, *price* 12s. 3d. (*see page* 312).

COPPER AND ZINC PROHIBITED USES (Ministry of Supply) (No. 4) ORDER, 1952. *S.I.* 1516 (*see this page*).

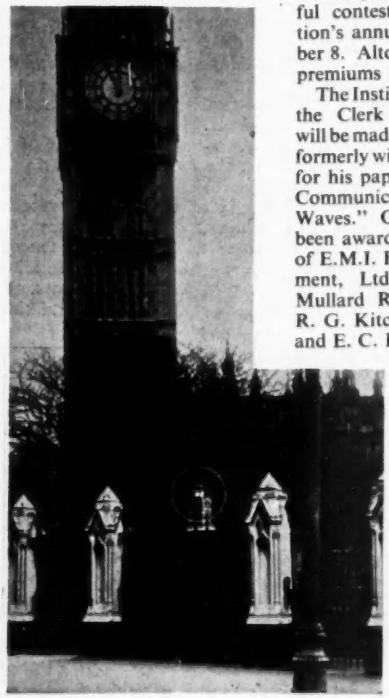
COPPER AND ZINC PROHIBITED USES (Board of Trade) (*Amendment* No. 2) ORDER, 1952. *S.I.* 1511 (*see this page*).

OVERSEAS ECONOMIC SURVEY, EGYPT. H.M.S.O., 4s. 6d.

Radio Engineers' Awards for 1951

PREMIUM and examination awards for 1951 have been announced by the British Institution of Radio Engineers, and will be presented to the successful contestants at the Institution's annual meeting on October 8. Altogether, six awards of premiums have been made.

The Institution's senior award, the Clerk Maxwell Premium, will be made to H. Paul Williams, formerly with A. C. Cossor, Ltd., for his paper on "Subterranean Communication by Electric Waves." Other premiums have been awarded to R. E. Spencer of E.M.I. Engineering Development, Ltd., Emlyn Jones of Mullard Research Laboratory, R. G. Kitchenn, C. E. Roberts and E. C. Rowe.



Recently installed in the precincts of the Palace of Westminster is one of Londex Ltd.'s mains operated winker lights. Its use will be to call taxis for M.P.s. A modification of the flasher is, incidentally, being prepared for use on zebra crossings

All Quiet in Meter Readers' Dispute

EVENTS in the dispute over the London Electricity Board's dismissal of 26 meter readers on the grounds of redundancy petered out towards the end of last week. The unofficial strike which was threatened did not take place, in fact only five strike notices were handed in and it was found that even those were not properly authorised—many of the men supposedly covered by the notices disclaiming any intention of stopping work. On Thursday and Friday the question of redundancy was discussed at a meeting of union representatives and the district joint industrial council for electricity supply workers. No statement was issued as to the proceedings or outcome of the meeting. Earlier, the Board had emphasised that they regarded the existence and extent of redundancy as a matter to be decided by management. The unofficial strike of 112 workers at Croom's Hill, Greenwich, over two dismissals, continues.

MR. NABARRO SEEKS NEW IDEAS

A MAN who in Parliament is frequently heard discussing questions of fuel efficiency, Mr Gerald Nabarro, is taking advantage of the summer recess to add to his knowledge of the subject. It is commonly believed that when Parliament reassembles in October one of the prominent issues before members will be a national fuel policy; and, if this is so, one can be reasonably certain that Mr. Nabarro will be in the forefront of any ensuing arguments. His plans, meanwhile, are to discover more about coalmining and hydro-electric power.

Mr. Nabarro will first be visiting Bolsover colliery where beneficial results have been obtained from continuous mining. Then next month he is to cross the Channel as the guest of Electricité de France, to tour the hydro-electric plants in the French Alps.

AN EXPLANATION OF CONSUMERS' COUNCILS

MUCH discussion has taken place among members of the S.E. Electricity Consultative Council in recent months concerning the advisability of publicising the Council's work. As a result it was decided to issue a leaflet explaining the functions and constitution, and setting out the procedure to be followed by consumers wishing to make representations or complaints. Those leaflets have now been prepared and will be available in the Board's showrooms. In addition copies are to be despatched to other interested persons, notably local authorities, local M.P.s and sundry public bodies and organisations.

B.E.A. moves to Bankside

THE new B.E.A. offices behind the Bankside power station which were pictured in these pages some weeks back, are now being occupied. Certain sections of the headquarters' engineering and accounts staff are moving there from the Winsley Street offices. The telephone number of the new building is Waterloo 2011.

KEADBY SWING-BRIDGE LITTLE USE TO B.E.A.

SOME discrepancy has occurred over contributions towards the construction of a new swing-bridge at Keadby Lock. Replying to the approach of Lindsey county council on the matter, the B.E.A. has stated that a scheme for access to the power station site involved them in considerable expenditure on a road which would not have been necessary had the bridge been available. Shortly there would be little use for the swing-bridge at all. The council's proposal had come much too late and the B.E.A. could not therefore recommend a contribution towards the scheme's cost. Nevertheless the B.E.A. is to be asked to arrange for representatives to meet the Highways Committee for further discussions.

Cold cathode lighting fittings supplied by Falk, Stadelmann, for the new hangars at London Airport

Cold Cathode Lighting for Hangars

POSSIBLY one of the largest lighting installations being carried out at the moment is that at London Airport (Heathrow), where some of the world's most modern hangars are now in the course of construction. Some idea of the extent of the hangars and of lighting system involved may be gained from our accompanying illustration. Four of the ten hangars proposed are now complete.

They have been illuminated by "Ionlite" cold cathode fluorescent lighting fittings, supplied by Falk, Stadelmann and Co. Ltd., which have been mounted in continuous rows under each roof beam. Shadowless light from a height of 40 ft. has been obtained for the whole area at an intensity of 25 ft. candles at floor level. We understand that the completed installation is remarkably effective, in fact work can be carried out on the underside of aircraft wings without resort to local lighting.

E.E. Rectifier Contract

WE have received from the English Electric Company, Ltd., further details of their recent order for thirty-three 2,500 kW rectifier equipments, which are for the Eastern Section of the Southern Region of British Railways. This order is part of a scheme for the replacement of the present obsolescent 25-cycle rotary convertors.

The rectifiers will be installed in 20 unattended substations and the equipment is due to go into service between the spring of 1953 and the summer of 1956.

Each 2,500 kW rectifier equipment consists of a 12-phase outdoor rectifier transformer and four type PVS1321 sealed steel tank rectifier units. The transformer is provided with tappings so that 2,200 kW can be supplied at the present d.c. system voltage of 660 pending a future raising of this system to 750 V d.c.

MOBILE REPAIR SQUAD FOR NOTTS CONSUMERS

NOTTINGHAM'S network of radio-connected vehicles is rapidly expanding. The first system of inter-communication concerned the police patrols, but since then it has been extended to include fire engines, ambulances and taxis. Now, the E. Midlands Electricity Board has started a "pilot" mobile repairs squad with men being directed from job to job by radio. The Board has been allocated five wavelengths for the scheme, which, it is hoped, will cut considerably the length of time taken to repair faults especially those caused by storms.

UNITED NATIONS SPEECHES RELAYED IN PARIS

ONLY last week did details become available of the multi-language simultaneous interpretation installation carried out by Tannoy Products, Ltd., in the Palais de Chaillot, Paris. The same firm, incidentally were responsible for a large part of the permanent installation at U.N. headquarters in New York. The Paris meeting place has been equipped with a system capable of transmitting speeches in five languages other than the "floor" language. The hall accommodates 2,400 seats.

The whole of the work, including design, schematic layout and production of cable form, was carried out in London. One of the features of the scheme was the use of 12 pin plugs and socket devices. This entailed providing Selector units, each of which was connected to a specially designed 12 core cable. The units were assembled in harness form to avoid soldering some 50,000 connections on the site. To avoid unsightly wiring and to ensure that the installation harmonised with the building's aesthetics, cables and Selector units were fixed by prefabricated special metal clip.

Metal Exchange Opens for Lead on October 1

THE Ministry of Materials announced last weekend that agreement had been reached with the Committee of the London Metal Exchange that the Exchange would definitely reopen for dealings in lead on October 1. No new contracts for sale of lead to consumers will be made by the Ministry after September 30. It will be recalled that the decision to reopen the London Metal Exchange for lead dealings was announced at the end of last month, when it was stated that the Exchange would probably open on October 1.

BANKSIDE AND LIGHTING COLUMNS NOT ARTISTIC

IN an address at the Institute of Public Administration's conference on "Art and the Public Authorities" in Edinburgh, Lord Crawford and Balcarres considered how best to protect the beauties and amenities of the towns and cities. He attacked some of the nationalised industries for their mistakes in the artistic field, decrying the B.E.A.'s decision to build a power station on the bank of the Thames facing St. Paul's Cathedral. He urged the electricity supply industry to give the country more power without destroying the beauty of a town.

Lord Crawford also criticised the erection of street lighting columns. The new concrete standards were suitable for main roads, he maintained, but in country towns the "dying swan with broken neck" and "illuminated pig-trough" designs were eyesores.

Mr. C. A. J. Martin presenting Crompton Parkinson's millionth instrument to Mr. I. T. L. Whipp, of Whipp and Bourne, Ltd.

Farmers Query Method of Assessment

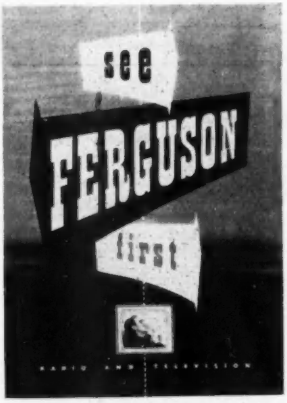
MEMBERS of the Easter Ross branch of N.F.U. are to ask the North of Scotland H.-E. Board if the method of assessing primary units of electricity could be adjusted to make charges more equitable. At a recent branch meeting it was stated that consumers of the old Ross-shire Electricity Supply Co. received the cheapest electricity in the country. Since then, however, quarterly bills in the Highlands had risen in some cases to twice the size of those in the southern counties.

This allegation was later refuted by the Board who stated there was very little difference between comparable tariffs.

Presentation of Millionth Instrument

A MILESTONE of some importance to Crompton Parkinson, Ltd., was passed at the company's Chelmsford works last Thursday. The directors of Whipp and Bourne, Ltd., gathered to receive a 6 in. dial, plastic cased circular scale moving coil instrument, the millionth instrument to be made and the first of a new range. The manufacture of high grade electrical instruments represented one of the earliest developments of the company, said Mr C. A. J. Martin, in his presentation address. He referred to the Crompton historic collection which housed possibly one of the earliest instruments produced in this country. Accepting the gift, Mr. I. T. L. Whipp said he would be pleased if the instrument would be accepted on permanent loan for addition to the collection.

Present on the occasion were Mr. Ian T. L. Whipp and Mr. Frank E. Whipp. Also there were Mr. A. V. Sowman, general manager at Chelmsford, Mr. C. A. J. Martin, general sales manager of the Plant Division, Mr. H. Craig, manager of the Instrument Department, Mr. W. C. C. Turner and Mr. B. Jubb.



New and attractive poster being issued by Thorn Electrical Industries for the forthcoming National Radio Show. Background of bright orange at the top merges into dark plum colour at the foot. The word "Ferguson" is in lemon yellow on black

U.S. Army Places Contract with B.T.H.

AN order for military electronic equipment has been placed by U.S. Army, European Headquarters Command, with the British Thomson-Houston Co. Ltd., it was announced by the latter firm last weekend. Value of the order was stated to be approximately $4,200,000. No further details of the contract were available at the time of going to press.

L.C.C. issues Annual Guide to Education

ONCE again, "Floodlight," London C.C.'s guide to further education has been published, and is available at bookshops and newsagents at 9d. This latest edition sets out all the facilities for evening classes and technical courses in the 1952-53 session which opens next month. Enrolment week begins on September 15 and classes start a week later. As in the past a comprehensive range of subjects is offered, not least among them the numerous aspects of electrical engineering, including electronics, radar, telecommunications and illuminating engineering.

PLANS FOR ELECTRIC RAILWAYS IN LONDON

SOME details of railway electrification in the London area were given by Mr. C. K. Bird, chief regional officer on the Eastern Region of B.R., in a letter read at a recent meeting at Enfield. Highest priority among schemes for improving travel facilities is to be given to the proposed new tube to pass through S. Tottenham to Victoria and eventually to S. Croydon. The Liverpool St.-Enfield line would have to wait until afterwards. Mr. Bird was answering protests against the Working Party Plan to give priority to Route C (S. Tottenham to Victoria) and Route D (Liverpool St. to Enfield). It was claimed that the latter should be carried out first because it would not involve such enormous capital expenditure. Communications with the West End and not with the City were considered most important and Route C had been designed to provide for this. This priority, stated Mr. Bird, had not at any stage competed with that given to the London-Southend line.

NEWS IN BRIEF

Lanarkshire's Lighting Authority has adopted Remington Rand's Kardex Records system to file details of all their street lighting points. It is hoped by quick and easy reference to recover some £500 a year on refunds and replacements.

Sir David Maxwell Fyfe will open Cardiff's exhibition of building plant which is to run for a week from September 18 to 24.

A guard was posted in a field at Lemington-on-Tyne to stop children grasping the wet string of a kite which had become entangled in overhead transmission lines.

The B.E.A. is to be asked by Yorkshire Parish Councils Association to abolish installation charges in rural areas.

Northampton Polytechnic has published its Prospectus of part-time courses in pure and applied chemistry for 1952-53.

Sheffield sub-area of Yorkshire Electricity Board has opened a new service centre at Dronfield, Chesterfield.

A new apprentices' school is expected to be completed next month at C. A. Parsons and Co.'s works, Newcastle-on-Tyne. The new premises will be five times the size of the present school. A large new research and design building also under construction is expected to be ready for partial occupation in October.

Sound Distribution at Radio Show

WE note that at this year's National Radio and TV Exhibition at Earls Court, Standard Telephones and Cables Ltd. have again been awarded the contract for the sound distribution system to be employed. Three separate relays are to be supplied: a main sound reproduction system, a V.I.P. system for use at the reception stage, and the B.B.C. television studio system.

As in previous years the studio will be modelled on the lines of the B.B.C. continuity suite and will be sound proofed, but it will be open to inspection by the public.

One of four new showcards for Exide and Drydex radio batteries designed for use of retailers during the National Radio Show. It is a bright cut-out in three colours measuring 14½ in. by 11 in. and capable of accommodating a radio accumulator

Company Activities . . .

Cable and Wireless (Holding)

The first interim dividend ever paid by the company will be paid on October 15 to holders of stock on September 17.

The dividend of 3% less tax will normally be followed by a final dividend for the year ending December 31, 1952, when the accounts are presented.

Engineering and Lighting Equipment

Trading profit for the year is £102,066 (*£89,847*). After taxation of £51,500 (*£43,500*) net profit is £33,616 (*£31,702*).

Adjustments for earlier years take £6,091 (*nil*), leaving £44,744 (*£24,852*) to be carried forward. A dividend of 10% less tax on the £100,000 Ordinary shares recommended compares with 5% for the previous year, first payment since the total of 8% for 1945-6.

London Electric and General Trust

Revenue to June 30, 1952, after expenses, debenture interest and income tax amounts to £34,845 against £32,354 for the previous year. It includes income received in excess of one year's income £3,028 (*£2,607*). Final dividend 5½% (4½%), making 8% (6½%) for year.

Metal Industries

Total assets of the group increased in year ending March 31 to £12,106,509 (*£10,829,555*). Yet properties, plant, etc., figured £2,119,684 after accumulated depreciation against £2,016,838. Current assets total £5,865,940 (*£4,644,395*). After depreciation there remains a net balance of £612,528 against £416,649, of which £609,179 (*£408,179*) is attributable to the parent concern. Ordinary dividends total 15% (*10%*), absorbing about £245,700 (*£155,851*).

Newton Bros. (Derby)

Trading profit for the year amounted to £155,070 (*167,094*) after income on investments £3,314 (*£2,746*), taxation £77,831 (*£84,215*), directors' remuneration and pension £11,315 (*£11,045*), depreciation £14,560 (*£12,145*), directors' fees £1,500 (*same*), to stock contingencies reserve £5,000 (*nil*) and a doubtful debt of £4,488 (*nil*) have been allowed the net profit is £43,690 (*£60,935*).

Placed to general reserve £15,000 (*nil*), £13,000 (*£11,000*) to replacement of fixed assets reserve, but nil (*£10,000*) for research and development and £2,000 (*£10,000*) and £1,000 (*£4,000*) to pensions and retirement and benevolent funds respectively. A sum of £30,150 (*£30,938*) is carried forward.

Nigerian Elec. Supply

Revenue from sales of power in year ended February 29, was £231,959 (*£207,933*). After providing £35,000 for depreciation, profit was £119,593 (*£108,886*). Taxation takes £67,529 (*£55,500*), so that after writing off capital increases the final net balance is struck at £50,597 (*£53,386*).

Funds in hand at the close of accounts amounted to £137,253 cash and £43,650 in gilt edge securities, net current assets increase to £281,670. Reserves total £175,523, not including £67,000 set aside for future tax.

Parmiter Hope and Sugden

Profit for year after charging directors' emoluments, depreciation and staff superannuation scheme, etc., is £90,428 (*£94,905*). Taxation takes £52,200 (*£52,950*), leaving £38,228 (*£41,955*), to which is added balance brought forward from last year £63,538 (*£63,477*), making available balance of £101,766 (*£105,432*). The directors propose to write off the goodwill, patents and trade marks standing in the balance sheet at £52,600 (*nil*) and transfer to general reserve £5,820 (*£25,000*). After dividends amounting to £19,553 (*£16,894*) have been deducted, there remains £23,793 (*£63,538*) carried forward.

Powell Duffryn

Consolidated net profit for the year ended March 31, 1952, is £731,686 (*£604,934*) after crediting transfer from taxation reserves £51,704 (*£72,452*) and after charging depreciation £347,467 (*£310,516*) and taxation £1,253,045 (*£1,041,460*). Credit of consolidated profit and loss account to be carried forward to 1952/53 is £2,174,673 (*£1,976,407*), after transferring to reserve £318,827 balance from a company liquidated during 1951/52.

Radio and Television Trust

Consolidated profit before taxation for the year to March 31 is £48,465 (*£49,787*). Taxation takes £12,290 (*nil*). Non-recurring credit of £653 (*£50,859*).

The adverse balance of consolidated profit and loss account is reduced to £790,210. Losses carried forward in holding company's accounts are £806,108, but profits of £15,898 are carried forward in accounts of subsidiaries.

Revo Electric

Net profit for the year after charging all expenses, apart from taxation, amounts to £411,083 compared with £286,814. Taxation requires £240,541, leaving a balance of £170.542. The dividend is the same as in the previous year, taking £53,058.

Scottish Cables

Trading profit for the year is £311,278 (*£274,561*). Adding income from trading investments £15,920 there is a total of £327,198. Auditor's fees and depreciation takes £23,503, leaving £303,695. Taxation (including reserve) takes £181,092 (*£143,700*) less over provision in previous years £2,297 making £178,795 to be deducted from profit available, thus leaving £124,900. When the balance brought forward from previous year of £25,606 is added, there is a profit available for appropriation purposes of £150,506 (*£127,935*). After dividends and the

expenses of share issue of £7,904, a sum of £60,000 is allocated to general reserve, leaving £26,515 to be carried forward.

Thorn Electrical Industries

Consolidated trading profit is £681,169 (*£517,373*), a rise of £163,846. Consolidated net profit is £211,819 (*£169,514*) after charging taxation of £288,185 (*£210,447*), depreciation and amortisation £139,381 (*£114,852*).

Minority interest is £934 (*£4,296*) and a sum of £120,000 (*£80,000*) is allocated to general reserve. Employees pensions nil (*£20,000*) and future tax reserve re initial allowances £15,000 (*£10,000*). Group carry forward is £65,974 against £52,109. Dividend of 12½% (*10%*) less tax on £528,750 Ordinary shares is recommended.

Walsall Conduits

Resolutions increasing capital to £500,000 by the creation of 750,000 additional 4s. Ordinary shares and the issue of a one-for-three scrip bonus (see ELECTRICAL TIMES, July 17, 1952) were approved by shareholders of the company at an extraordinary general meeting held last week.

Dividends Declared

Cable and Wireless (*Holdings*).—Interim 3% payable October 3.

Cape Electric Tramways (*1949*).—Dividend of 5½% (*5% last year*).

Crompton Parkinson.—Interim dividend of 4% on first Preference stock, and interim dividend of 3% on second preference stock. Both payable September 30.

English Electric.—Interim dividend 5% (*same*) less tax payable September 15.

Powell Duffryn.—Dividend of 5% payable September 30 against 10% last year, making total for year 25% as against 10% last year.

Thorn Electrical Industries.—12½% (*10%*) less tax on Ordinary shares.

Electric Supply News . . .

Durham

The villages of Holmside and Peartree at present receive their supplies of electricity from plant operated by the National Coal Board. It is carried by overhead transmission lines for four miles from Sacriston, but it has been found that in the evenings the voltage is so low that consumers are unable to read. Complaints to this effect have recently been made by Lanchester R.D.C. The transfer of the system to the N.E. Electricity Board is in abeyance pending settlement on the question of compensation to the N.C.B.

London

Latest milestone in the progress of the Bankside generating station towards its expected commissioning later this year, has been the arrival of the first large consignment of fuel oil. These were brought from Shell Haven in eight shipments, totalling some 4,000 tons, and together filled the first of the six storage tanks that are sited underground at the rear of the power station.

The station is served by a 290 ft. long jetty, which can at present accommodate 500 ton tankers. Later it is hoped to cater for vessels of double this capacity. By the time this 120MW station is in full operation, it is expected that maximum shipments of oil will be 120,000 tons a year.

Monmouthshire

The Monmouthshire Federation of Trades Councils recently criticised a B.E.A. proposal to build a power station near Rhiwderin. It was suggested that a good alternative site would be that at Winchestown—some 50 acres in extent and close to adequate supplies of water and coal and near the railway. The Federation is understood to have suggested earlier that the station be built on poor open land between Nantyglo and Beaufort. The suggestion was rejected on the grounds that there was insufficient water, the land was not flat, and there was a danger of subsidence due to mining.

The secretary has been instructed to write to the Minister of Fuel and Power asking him to withhold a decision on the Rhiwderin site until the one at Winchestown has been examined. Meanwhile the N. Monmouthshire Development Association is to be asked to convene a meeting to discuss the matter and representatives of the B.E.A., local councils and other interested bodies will be invited to attend.

LIGHTING SCHEMES

Bexley (Kent).—Tenders to be invited by T.C. for street lighting improvements in Erith Rd., estimated to cost £1,460.

Blackpool.—Conversion of gas lamps to electricity is estimated to cost the Corporation £16,300.

Crook U.D.C.—About £1,970 is to be spent on the installation of 47 lighting units on the Low Willington Estate.

Darlington.—T.C. has modified plans for improvements to street lighting in Comscliffe Rd. area. Revised cost is £4,470.

Dungannon.—New lighting scheme for the entire urban area, at a cost of £5,850, has been approved. Ministry to be requested to sanction a loan.

Durham.—City Council is to carry out a street lighting scheme at cost of £2,420. Work includes provision of 34 units in Sutton St., Alexandra Cres. and Crossgate Peth.

Eastbourne.—Scheme is being prepared involving erection of lamps in Royal Parade's garden triangle.

Commercial Information

CONTRACTS OPEN

HOME

Aug. 23.—Angus. Electrical work in building of 10 houses at Muirhead-of-Liff. County architect, County Bldgs., Forfar.

Aug. 23.—Clackmannan. Electrical work in erection of secondary school at Parkhead, Alloa. Applications by above date to N. A. Scorgie, county clerk, County Buildings, Alloa. Deposit £1 1s.

Aug. 23.—Stroud (Glos.) R.D.C. Wiring in houses in Tetbury St., Minchinhampton. Housing Manager, Council Offices.

Aug. 25.—Bury T.C. Electrical installation at Fairfield Primary School. Borough Engineer, Town Hall. Deposit £2 2s.

Aug. 25.—Haltemprice U.D.C. Complete installation of street lighting in parts of Cottingham district, including concrete columns, lanterns, 85 W sodium lamps along 2·7 miles, and cast-iron columns, lanterns and 150 W tungsten lamps along 1·2 miles. Engineer and Surveyor, Anlaby House, Anlaby. Deposit £2 2s.

Aug. 25.—Stranraer T.C. Electrical fittings for 12 houses on Mid Belmont site. Applications to Moffatt and Wright, quantity surveyors, 51 Sandgate, Ayr.

Aug. 26.—Peterhead T.C. Electrical work in erection of 16 houses on Blackhouse site. R. D. Cruickshank, burgh architect, 60 Broad St.

Aug. 28. — Newcastle-on-Tyne. Supply of 63 140 W sodium street lighting lanterns with control gear. F. S. Taylor, General Manager, Transport and Electricity Undertaking, Manors, Newcastle. (See August 14 issue.)

Aug. 28.—Antrim R.D.C. Electrical work in 34 houses being built at Doagh. Architects, W. D. R. and R. T. Taggart, 36-38 Castle Arcade Buildings, Belfast. Deposit £3 3s.

Aug. 29.—N. of Scotland H.-E. Board. Tenders invited for multicore high- and low-voltage paper insulated cables. Particulars from Area Manager of Board, Dundee Area, Dudhope Crescent Rd., Dundee. (See August 14 issue.)

Aug. 30.—Ashton-in-Makerfield U.D.C. Supply of mobile tower unit for street lighting purposes. Surveyor, Town Hall.

Aug. 30.—Basingstoke. Park Prewett Hospital Management Committee invites tenders for supply of electric lamps during six months beginning October 1. Secretary is Fredk. Hayes.

Aug. 30—Dearne (Yorks) U.D.C. Provision and erection of 19 concrete columns with 240 W fluorescent tubes and lanterns, etc., for street lighting in Barnsley Rd., Goldthorpe. Engineer and Surveyor, Council Offices, Bolton - upon - Dearne, near Rotherham.

Sept. 1.—Aspull (Lancs) U.D.C. Electrical wiring in 20 houses on site 11, Hilton scheme. Engineer and Surveyor, Council Offices.

Sept. 1.—Cookstown (Tyrone) U.D.C. Installation of electric light, etc., in 48 houses and 6 flats at Monrush. A. Montgomery, clerk, Council Offices, Molesworth Street.

Sept. 1.—Newcastle. Tyne Improvement Commission requires supply, laying and jointing of cables in connection with power supply to coal loading plant at Whitchill Point, North Shields. Secretary of Commission is J. K. McKendrick, Berwick St., Newcastle. Deposit £1. 1s. (See August 14 issue.)

Sept. 1.—N. Ireland. Electrical work in 20 houses at Dungannon for N.I. Housing Trust. Trust is at 12 Hope St., Belfast. Deposit 10s.

Sept. 1.—Slough T.C. Provision of 100 concrete columns and lanterns with 80 W mercury lighting equipment and erection of 28 such units for Class B street lighting scheme. Borough Engineer, Town Hall. Deposit £1 1s.

Sept. 1.—West Riding. Renewal of electrical installation at "The Beeches," Tadcaster. Applications to County Architect, "Bishopgarth," Westfield Rd., Wakefield. Deposit £2 2s. (See August 7 issue.)

Sept. 2.—Windsor R.D.C. Internal wiring of 16 houses at Sunningdale, and 12 each at Sunninghill and Old Windsor. Building Surveyor, Council Offices, Bowden Rd., Sunninghill.

Sept. 3.—Greenwich B.C. Tenders invited for electric street lighting schemes under Contract No. 1: removal of 367 h.p. gas columns and adaptation and re-erection of 233 columns, and adaptation *in situ* of 141 columns; and under Contract No. 2: provision of bracket arms, lanterns, control gear and wiring to 374 columns and 2 suspended lanterns. Borough Engineer and Surveyor, Town Hall, S.E.10. Deposit £2 2s. (See July 24 issue.)

Sept. 3 — Newcastle-on-Tyne. Repair and maintenance of electric lighting on various estates for six months, beignning Oct. 1. Applications to City Architect, 18 Cloth Market, Newcastle.

Sept. 3.—Stepney B.C. Provision and installation of five electric passenger lifts in Cornwall St. housing scheme. Borough Engineer and Surveyor, Municipal Offices, 227/233 Commercial Rd., E.1.

Sept. 5.—Stourbridge T.C. Installation of 62 units of Class A street lighting with mercury lamps and concrete columns. G. N. Maynard, Borough Engineer and Surveyor, The Council House.

Sept. 6.—Ormskirk U.D.C. Supply of 63 concrete columns, lamps, lanterns and components for Group A and B street lighting. Surveyor, Council Offices, Burscough St. (See August 14 issue.)

Sept. 8.—Musselburgh. Erection of 15 lamp standards and installation of sodium lamps in Pinkie Rd. Burgh Surveyor, Municipal Offices, High Street.

Sept. 8.—Wymondham U.D.C. Supply and installation of 21 concrete columns, lanterns, etc., on London-Norwich Rd. and in conversion of street lighting from gas to electric. T. J. Turner, clerk, Council Offices. Deposit £2 2s. (Advertised in this issue.)

Sept. 9.—Dover T.C. Supply and erection of 11 concrete columns and fixing of H.P.M.V. units and auxiliary equipment and complete wiring along Snargate St. Also supply of 11 sets of lanterns, 400W H.P.M.V.

lamps, gear, time switches, all to Group A standard for same scheme. These are separate contracts. Borough Engineer, Brook House. Deposit £2 2s. in each case. (Both are advertised in this issue.)

Sept. 10.—Edinburgh. Electrical installation in 185 houses at Clermiston. City Architect, City Chambers, Edinburgh 1.

Sept. 12.—Edinburgh. Lighting and power installations in 90 houses and 15 shops on Inch Housing Development. City Architect's Office, City Chambers.

Sept. 12.—Kendal T.C. Provision and installation of 72 mercury vapour lighting units and 7 fluorescent units, in Group A, including concrete columns and auxiliary equipment, and wiring along Windermere Rd. Borough Engineer and Surveyor, Municipal Offices, Lowther Street. (See July 24 issue.)

Sept. 12.—Sheffield. Electrical installation in Hurlfield secondary school. W. Geo. Davies, City Architect, Town Hall. Deposit £2.

Sept. 13.—Consett (Dur.) U.D.C. Installation of electric lighting in 34 houses at Shotley Bridge. Applications to E. Simpkin, surveyor, Council Offices, Medomsley Rd., by above date.

Sept. 22.—Haverfordwest T.C. Installation of electric light and power in about 143 houses in scheme No. 2. Borough Surveyor, 9 Victoria Place. Deposit £2.

No date stated.—N. of Scotland H.E. Board. Supply and erection of approximately 13 miles of 33 kV double-circuit woodpole overhead lines in Killin district, Perthshire. Merz and McLellan, 39 Northumberland St., Edinburgh 3. Deposit £2 2s. (See August 7 issue.)

No date stated.—Bristol. Electric batteries, lamps and general items included in list of supplies required by Southmead General Hospital. C. C. Hancock, secretary, Group Administrative Offices, Southmead Hospital, Bristol.

OVERSEAS

*Details of items marked * may be obtained on application to the Board of Trade, Horseguards Avenue, S.W.1, quoting reference.*

Sept. 8.—India. Supply of 100 T.P.S. and disconnecting switches with capacity of 100 A for 15,000 V circuit, and 100 same with capacity of 200 A for 5,000 V circuit. Stores Purchase Committee, Govt. of Mysore, Bangalore. B.o.T. (Ref. CRE 27712/52)*.

Sept. 9.—India. Directorate of Supplies and Disposals, Govt. of India, Bombay, invites tenders for supply of centrifugal pumping sets, transformers and switchgear for Central Railway, Bombay. B.o.T. (Ref.: CRE 27622/52)*.

Sept. 11.—South Africa. S. African Dept. of Transport requires six constant voltage transformers. Chairman of Tender and Supplies Board, 271 Visagie St. (P.O. Box 371), Pretoria. B.o.T. (Ref.: CRE 27692/52)*.

Sept. 11.—India. Supply of 24 triple pole, single throw, pole-mounted, non-automatic oil circuit-breakers to various specifications. Stores Purchase Committee, Govt. of Mysore, Bangalore. B.o.T. (Ref. CRE 27713/52)*.

Sept. 18.—New Zealand. Supply of various types and quantities of fuses, fuse holders and fuse terminals for N.Z. Post Office, Wellington. B.o.T. (Ref.: CRE 27694/52)*.

Sept. 18.—New Zealand. Post and Telegraph Dept., Wellington, requires supply of M.I.C.C. "Pyrotenax" power cable and fittings. Director General (Stores Div.), G.P.O. Wellington. B.o.T. (Ref.: CRE 26738/52)*.

Oct. 1.—South Africa. Manufacture and supply of glass bulb or pumpless steel tank mercury arc rectifiers complete with d.c. switchgear and all auxiliary equipment for Cape Town Electricity Dept., Electricity House, Strand St. B.o.T. (Ref. CRE 27963/52)*.

Oct. 1.—New Zealand. Post and Telegraph Dept., Wellington, invites tenders for supply of 250 d.c. moving coil milliammeters. B.o.T. (Ref. CRE 27760/52)*.

Oct. 8.—Australia. State Electricity Commission of Queensland requires supply of busbar insulators and accessories. Commission is at Scottish Union House, Eagle St., Brisbane. B.o.T. (Ref.: CRE 26870/52).*

Oct. 17.—South Africa. Supply and erection of one 40,000, 3,300/6,600 V, 2,500 kVA on-load tap changing transformer; six 36,000, 3,300/6,600 V, 2,500 kVA same; and two 33,000, 3,300/6,600 V, 5,000 kVA same, for Municipality of Germiston. Specifications from Consulting Engineer, Tranvalic Bldg., 21 Stiemens St., Braamfontein, Johannesburg. Deposit £3 3s.

Nov. 12.—Australia. Supply of 107 station type, outdoor, self-supporting lightning arresters to various specifications for State Electricity Commission of Queensland, Scottish Union House, Eagle St., Brisbane. B.o.T. (Ref. CRE 29729/52)*.

Your Queries — Answered

"Hammond" clocks, agents for? S.W.—Boosey and Hawkes, Ltd., 295 Regent St., W.1. (23681)

"Bunting" fires, makers of? M.E.—Bunting Electric Co., Ltd., 14 Hall St., Birmingham. (23689)

"B.E.L." violet ray apparatus, makers of? J.J.—These were made by the Bower Electric Ltd., a firm which went out of business many years ago. (23696)

"Syphonit" washing machine emptying device, makers of? B.C.—Labour Saving Appliances, 5-7 Chester St., Manchester 1. (23704)

"Celeron" insulating material, makers of? E.R.—Diamond Fibre Co., Ltd., 59 Southwark St., S.E.1. (23711)

"Eltex" infra-red equipment, etc., for poultry, makers of? L.E.—Geo. H. Elt, Ltd., Eltex Works, Bromyard Rd., Worcester. (23718)

"F.S.C." in leaf design, accessories, makers of? T.E.—Falk Stadelmann and Co., Ltd., 91 Farringdon Rd., E.C.1. (23725)

"Centec" tools, makers of? S.C.—Central Tool and Equipment Co., Ltd., Mayland Ave., Hemel Hempstead. (23731)

The above are selected from questions we have answered this week. If you have a query, send it to us.

Contracts Open—Overseas—cont.

No date stated.—Uganda. Electricity Board invites tenders for supply and erection of eight single-phase 10 MVA transformer units at Owen Falls power station and at Tororo; also two earthing transformers at latter site. Documents from Board's offices at 129 Grand Bldgs., Trafalgar Sq., London S.W.1. Deposit £2 2s. (See August 14 issue.)

PRICE OF CABLE METALS AND OTHER MATERIALS
(at Tuesday night)

	£ s. d.	New York price
COPPER, electrolytic	285 0 0	—
LEAD, good soft pig (foreign)	131 0 0	£128 0 0
" " "English" quality ...	132 10 0	
TIN (99·99·76—) ... ... (Cash)	953-955	—
" (3 months)	939-940	—
ALUMINIUM, commercial purity (del.)	157 0 0	—
ZINC	122 0 0	£112 0 0
ARMOURING:		
Galv. Steel Wire (0·104 in.) ...	54 0 0	—
Mild Steel Tape (0.04 in.)	39 15 0	—

GAZETTE ANNOUNCEMENTS

COMPANIES ACTS

Voluntary Liquidation

Electronics (Clayton) Ltd. Meeting of creditors will take place at H. B. Britcliffe and Co., 15 Avenue Parade, Accrington, on Aug. 25 at 11 a.m.

Lancashire Cables Ltd. Meeting of members is to take place at Orient House, 42-45 New Broad St., E.C.2, on Sept. 29 at 3.35 p.m. to receive liquidator's report.

Onchan Electrical and Radio Service Ltd. Resolution for voluntary winding-up passed at meeting on Aug. 11, when J. W. Manderson of St. George's Chambers, Athol St., Douglas, I.o.M., was appointed liquidator.

Planet Refrigeration Co. Ltd. Meeting of creditors will be held at Watts and Co., 198 Marton Rd., Middlesbrough, on Sept. 3, at 12 noon to nominate, if necessary, liquidator and committee of inspection.

Sterling Cable Co. Ltd. Meeting of members is to be held at Orient House, 42-45 New Broad St., E.C.2, on Sept. 29 at 3.30 p.m. to receive liquidator's report.

Harvey Briggs (Refrigeration) Ltd., of Stockport and Liverpool. At statutory meeting of creditors a statement of affairs showed liabilities of £23,418, of which £17,403 was due to trade creditors; £1,408 in respect of deposits received; £347 directors loan account; and £4,258 directors bonus accounts. In addition Bank were fully secured creditors for £10,803 holding securities (freehold property at Stockport and Liverpool) valued at £12,500. Assets were estimated to realise £10,703 and after allowing £2,402 for preferential claims, there were net assets of £8,300, or a deficiency as regarded creditors, subject to costs and expenses of realisation, of £15,117. Issued share capital was shown at £5,000 and, so far as the shareholders were concerned, there was a total deficiency of £20,117. Undertaking was given by directors to withdraw their bonus account claims of £4,258 in favour of the general body of creditors. A Resolution was passed confirming voluntary liquidation with Mr. A. T. Eaves, C.A., of Harry L. Price and Co., 47 Mosley St., Manchester, and Mr. J. L. Holt, C.A., of 55 Market St., Manchester, as joint liquidators. Committee of inspection was also appointed.

Brite-Lite (Mirrors) Ltd. Resolution for voluntary winding-up passed at meeting on July 30. Sidney Chater, C.A., 35 Windsor Place, Cardiff, was appointed liquidator, and creditors are asked to send particulars to him by Sept. 20.

Daco Refrigeration Ltd. Meetings of creditors and contributories will take place tomorrow (Fri.) at Official Receiver's Office, Somerset House, 37 Temple St., Birmingham, at 11.15 a.m. and 11.45 a.m. resp.

Danbury Engineering Ltd., mechanical, electrical and general engineers of Danbury, Essex. Liquidator, Bernard Phillips of 76 New Cavendish St., W.1, released as from June 18.

Company Winding-up

Electrical and Radio Engineers (Golders Green) Ltd., electrical radio and television engineers, of Lincoln's Inn Fields, London. At meeting of creditors, Official Receiver reported that winding-up order was made on July 7. Statement of affairs showed unsecured liabilities of £3,243 against assets, after preferential claims of £237 had been deducted, estimated to realise £689. Deficiency was expected to amount to £2,554 as regarded creditors. No resolution was passed and matter was left in hands of Official Receiver as liquidator.

BANKRUPTCY ACTS

Public Examination

Great Grimsby. Kenneth G. Rudd, radio and electrical contractor, of 4 Commercial Rd., Louth. Public examination will be at Town Hall, Gt. Grimsby, on Oct. 2, at 11 a.m. First meeting took place yesterday, Wed.

Intended Dividends

Colchester. Clarence L. Philpott, radio and electrical dealer of 55 High St., Walton-on-Naze. Last day for receiving proofs, Aug. 29. Trustee is A. W. Hunter, Walter House, 418-422 Strand, London, W.C.2.

London. Raymond H. Tuck, trading with another as London Electrical Contractors at 109 Gt. Russell St., W.C.1, and 9 Newman St., W.1, and also as Brotherton and Tuck at 9 Newman St. Last day for receiving proofs, Aug. 29. Trustee is W. F. Cresswell, Bankruptcy Buildings, Carey St., W.C.2.

Portsmouth. Reginald G. Eves, electrical engineer, trading as the Abbey Restaurant at 28 East St., Titchfield. Last day for receiving proofs, Sept. 2. Trustee is W. H. Meredith, Official Receiver, 16 Westwood Rd., Southampton.

CONTRACTS PLACED

Banbury T.C. Installation of immersion heaters in 244 houses. C. A. Hale, £2,278.

Barrow (Lancs) T.C. Electrical installation at S. Newbarns infants' school, N. Western Electricity Board, £1,742.

Bromley. Electrical installation in Pickhurst primary school, Reid and Barrow, Ltd., £1,013.

Finchley T.C. Provision of street lighting lanterns, control gear, etc., for scheme along North Circular Rd., General Electric Co., Ltd., £3,353; concrete columns for same, Concrete Utilities, Ltd., £4,550.

BUSINESS PROSPECTS

HOME

Abingdon (Berks) R.D.C. Erection of 144 dwellings on Dean Court estate, Botley. Architect, Council Offices, 60 Bath St.

Alva (Clackmannan) T.C. has approved construction of 24 houses in Green Square.

Atherstone (War.) R.D.C. Construction of 48 houses on Coronation Ave. No. 3 site at Polesworth. H. N. Jepson, architect, Midland Bank Chambers, Nuneaton.

Banbridge R.D.C. Construction of 96 houses on eight sites. Architect, D. W. Chambers, Town Hall, Banbridge (N. Ireland).

Belfast. Construction of Ben Madigan primary school in Limestone Rd. Education Architect's Dept., Academy St.

Beverley R.D.C. Erection of 32 houses at Molescroft. G. Palfreman, Surveyor, Engineer and Architect, 36 Market Place.

Bishop Auckland U.D.C. Eighty houses and 14 bungalows to be built on Woodhouse Close Estate.

Burton-on-Trent T.C. Construction of Winshill junior school. Borough Surveyor, Town Hall.

Campbeltown T.C. Approval granted for erection of 52 houses on Calton site for Scottish Special Housing Association.

Chatham. Scheme approved for blocks of flats on Weeds Wood estate.

Consett U.D.C. Plans being prepared by J. J. Eltringham, Architect, Derwent St., Blackhill, for shops on Richard Murrary Hospital Estate.

Edinburgh. Dean of Guild Court has approved erection of a church in Oxgangs Rd. North, for Church of Scotland General Trustees. Estimated cost is £18,000.

Egham (Surrey) U.D.C. Erection of 26 houses on Thorpe Rd. estate. Engineer and Surveyor, Fire Station Bldgs., High St.

Enfield. Reconstruction and enlargement of Enfield county school for girls proposed at estimated cost of £103,090.

Gourock (Renfrew). Dean of Guild Court has approved erection of 46 houses at Kirn.

Grangemouth. Plans approved for construction of £40,000 shopping centre at new suburb of Beancross. Also Dean of Guild Court has approved erection of 36 houses.

Gt. Yarmouth T.C. Erection of 137 flats and maisonnettes in Middlegate St. Borough Engineer's Architects' Office, 8a Queen St.

Hayes and Harlington. It is proposed to build a £129,343 junior and infant school on Minet estate.

Hebburn (Dur.). Electrical installation at Mid-Tyne Technical College proposed at estimated cost of £4,028.

Hull. Erection of Eastcourt St. primary school. City Architect, Guildhall.

Huntingdon T.C. Plans in hand for 50 houses in American Lane.

Johnstone T.C. Approval granted for erection of 20 houses in Rankine St., and 44 on Coleraine Castle site. Letter for Scottish Special Housing Association.

Lancaster. Construction of 212 dwellings on Ridge Estate and eight shops with living accomodation on Hale Estate. City Engineer, Town Hall.

Lisburn. Ulster T.B. Authority is to build a hospital on Brookhill estate at estimated cost of £2 million. Also erection of 121 houses on Jubilee Ave. estate. Town Surveyor, Town Hall.

Loughborough. Wm. Hammond and Son, Ltd., are seeking permission to extend premises in Havelock Street.

Manchester. Erection of two groups of seven shops and maisonnettes at Wythenshawe. City Architect, Town Hall.

New Hunstanton U.D.C. Erection of 24 houses on Hill St. site. Council's Architect, Ellis Middleton, Central Chambers, 1 Norfolk St., Kings Lynn.

Peterlee (Dur.). Plans to be prepared for new fire station.

Petersfield (Hants) R.D.C. Erection of 34 houses and eight bungalows on Gunns Farm estate. G. H. Walker, clerk, The Old College.

Plymouth. Approval sought for extensions at 53 Mutley Plain by Lloyds Bank Ltd., and at Honicknowle for Sportcraft Ltd.

Prestatyn U.D.C. Erection of 20 houses at Meliden. T. Grant, Engineer and Surveyor, Council Offices.

Queenborough T.C. Plans for 1953 include erection of 54 houses and six bungalows.

Rawtenstall T.C. Erection of 51 houses on Lomas Lane estate and 61 on Staghill estate. Borough Surveyor, Town Hall.

Saltburn U.D.C. Erection of 26 dwellings on Marske Rd. Estate. Architect is C. D. Taylor, 41 Baxtergate, Whitby.

Skegness U.D.C. Erection of 20 houses on Sundial estate. Surveyor, Town Hall.

South Shields T.C. Construction of 68 dwellings on Section 3 of Simonside estate. Borough Engineer, Town Hall.

Spalding U.D.C. Permission received to build 23 houses on St. Pauls Estate. Also, tenders to be invited soon for installation of electricity in 102 council houses.

Stalybridge T.C. Erection of 78 houses on Stamford Park estate. P. W. Musther, Town Clerk, Stalybridge.

Stourbridge T.C. Approval of council sought for erection of 528 dwellings on Pedmore Fields estate, as well as for flats, church, hall and community centre on Norton estate.

Thornaby-on-Tees. Plans prepared for construction of 36 houses on Diamond Rd. estate.

Thornton Heath (Surrey). J. R. Preston and Partners, consulting engineers, Malet St., W.C.1, are likely to be appointed by S.W. Metropolitan Hospital Board for rewiring of Mayday Hospital.

Uttoxeter (Staffs) U.D.C. Plans approved for 62 houses on Cope's Park Farm estate.

Uxbridge. C.C. recommended to approve erection of instalment of secondary school at Harefield. Cost estimated at £73,790.

Walsall T.C. Erection of 54, 52 and 34 houses in three contracts on Daw End estate. M. E. Habershon, Borough Engineer and Surveyor, Council House.

Wandsworth. It is proposed to build 603 dwellings and 8 shops in 1953.

Wandsworth B.C. Erection of 3 blocks of (152) flats on Roupell Park estate. R. H. Jerman, town clerk, Municipal Buildings, S.W.18. Also scheme approved for development of Atkins Rd. site by erection of 45 flats and 12 houses at estimated cost of £123,000.

Warmley (Glos.) R.D.C. Erection approved of 34 houses at Cadbury Heath. Estimated cost, £44,000.

Business Prospects—cont.

Watford. C.C. proposes to build two schools and health clinic on Oxhey site No. 7. Estimated cost, £110,855.

Welwyn Garden City. Plans prepared for extensions to grammar school costs £534,00.

OVERSEAS

Pakistan. Ministry of Food and Agriculture are seeking quotations from U.K. manufacturers, for small and medium sized deep freeze plant, and medium-sized refrigerated fish cabinets. Detailed information should be sent to the U.K. Trade Commissioners, Finlay House, McLeod Rd., Karachi.

TRADE NOTES

Zinc Price. As from August 31 price of good ordinary brand zinc was increased by £4 to £122 a ton delivered to consumers' works. Premiums for higher grades remain unchanged.

C.S.A. Approval. Dale Electric (Yorkshire) Ltd. have received Canadian Standards Association approval (No. 11750) for their automatic, semi-automatic and hand control diesel generating plants.

Overseas Agents. Johnson and Phillips Ltd. have announced appointment of The China Engineers Ltd., 41 Chartered Bank Chambers, P.O. Box 563, Singapore, as sole agents in Singapore and Malaya.

Explanation. The Millman Refrigeration Service, Ltd., of 200 Kensington High St., W.8, have asked us to point out that they have no connection with Mr. R. E. Stebbings, formerly trading as Millman Refrigeration Service whose release from bankruptcy was noted in our July 31 issue.

Changes of Address. Manchester service depot of Parnall (Yate) Ltd. is moving to new premises at 70 High St., Chorlton-on-Medlock, Manchester 13, and will operate from there as from Sept. 1. Telephone number: Rusholme 3358. Telephone numbers at the company's Oxford and Stoke-on-Trent depots have been changed to Oxford 2924 and Longton 33395 respectively.

The Electrical Remote Control Co., Ltd., are taking over a new factory in the Harlow New Town industrial area. As from Sept. 6 their address will be Elremco Works, East Industrial Area, Harlow New Town, Essex. Telephone: Harlow 3032.

NEW COMPANIES

Extracted from the Register issued by Jordan and Sons, Ltd., 116 Chancery Lane, London W.C.2.

Ascot Engineering Co. Ltd. To enter into agreement with Cheshire Engineering Co. Ltd. to take over business carried on at Ascot, Berks, and elsewhere, as Ascot Engineering Company, mechanical, electrical, hydraulic, marine, chemical and general engineers, etc. Cap.: £5,000. Dirs.: not named. Subs.: R. A. Clark and R. G. Norton, 18 Austin Friars, E.C.2.

Brimac (Products) Ltd., 37 West St., Horsham, Sussex. Manufacturers of and dealers in artificial lighting apparatus, electrical plant, machinery, etc. Cap.: £5,000. Dirs.: W. B. Mackie, K. I. Goodman and A. C. Baker.

Electronic Assemblies Ltd., 223 Whittington Rd., N.22. Assembling and wiring of all electrical units and the general development of the same, etc. Cap.: £100. Dirs.: F. R. Shearman, A. O. Shearman and J. Shearman.

Harris and Soneya Ltd., 7 Vigo St., W.1. Manufacturers of and dealers in electric lamps and shades, etc. Cap.: £100. Dirs.: M. Harris and J. Soneya.

H. C. Hopkins and Co. Ltd., 25 Charles St., Leicester. Wholesale dealers in electrical goods, etc. Cap.: £2,000. Permt. dirs.: H. C. Hopkins and J. W. Symington.

Peterlite Products Ltd. To acquire letters patent; to carry on business of electrical or mechanical engineers, etc. Cap.: £100. Dirs.: P. M. K. Koch de Gooreynd and W. S. Gregg, addresses not stated. Subs.: L. J. Miller, 72 Ladysmith Av., East Ham, E.6, and Miss J. M. Morris, 69 Ridge Rd., Stroud Green, N.8.

Radtel Rentals Ltd., 47 Victoria Rd., Surbiton, Surrey. Manufacturers, hirers out and repairers of and dealers in electrical and mechanical apparatus and accessories, in particular wireless and television sets, etc. Cap.: £100. Dirs.: G. E. Douch and B. J. Taylor.

A. Roberts and Co. (Balham) Ltd., 57 Bedford Hill, Balham, S.W.12. Manufacturers of and dealers in electrical and mechanical apparatus, wireless and radio sets, etc. Cap.: £2,000. Dirs.: J. W. Lightfoot and Georgina B. Lightfoot, and R. G. Lightfoot.

W-B Electro-Mechanics Ltd., 49 Kensal Rd., W.10. Cap.: £100. Dir.: E. P. Wade-Brown.

TRADE MARKS

This information is extracted from the Official Journal by permission of the Controller.

Falcon, with design. B705,777. Class 9. Radiogramophones, radio sets, etc. John Street Manufacturers, Ltd., 117 Manor Lane, Lee, S.E.12.

Solartron. 706,195. Class 9. Electronic, electrical, scientific, nautical, surveying, radio, television and photographic instruments and apparatus, etc. Solartron Laboratory Instruments, Ltd., 22 High St., Kingston-on-Thames.

Solwarm. 708,061. Class 11. Electrically heated blankets (not for medical purposes). Robert Holt (Middlesex) Ltd., Florence Bldgs., Florence Rd., Edmonton, N.18.

Sunshine. B703,358. Class 11. Electric lighting sets for Christmas trees and for similar decorative purposes. Britannia Electric Lamp Works, Ltd., 17/21 Sunbeam Rd., Chase Estate, N.W.10.

Tocco. B691,567. Class 11. Electric induction heating apparatus for the treatment of metals. Electric Furnace Co., Ltd., 17 Victoria St., S.W.1.

Webslight Ltd., with design. 707,641. Class 9. Luminous signs. Webslight Ltd., 265 Martin's Bank Bldgs., Water St., Liverpool 3.

MEETINGS TO NOTE

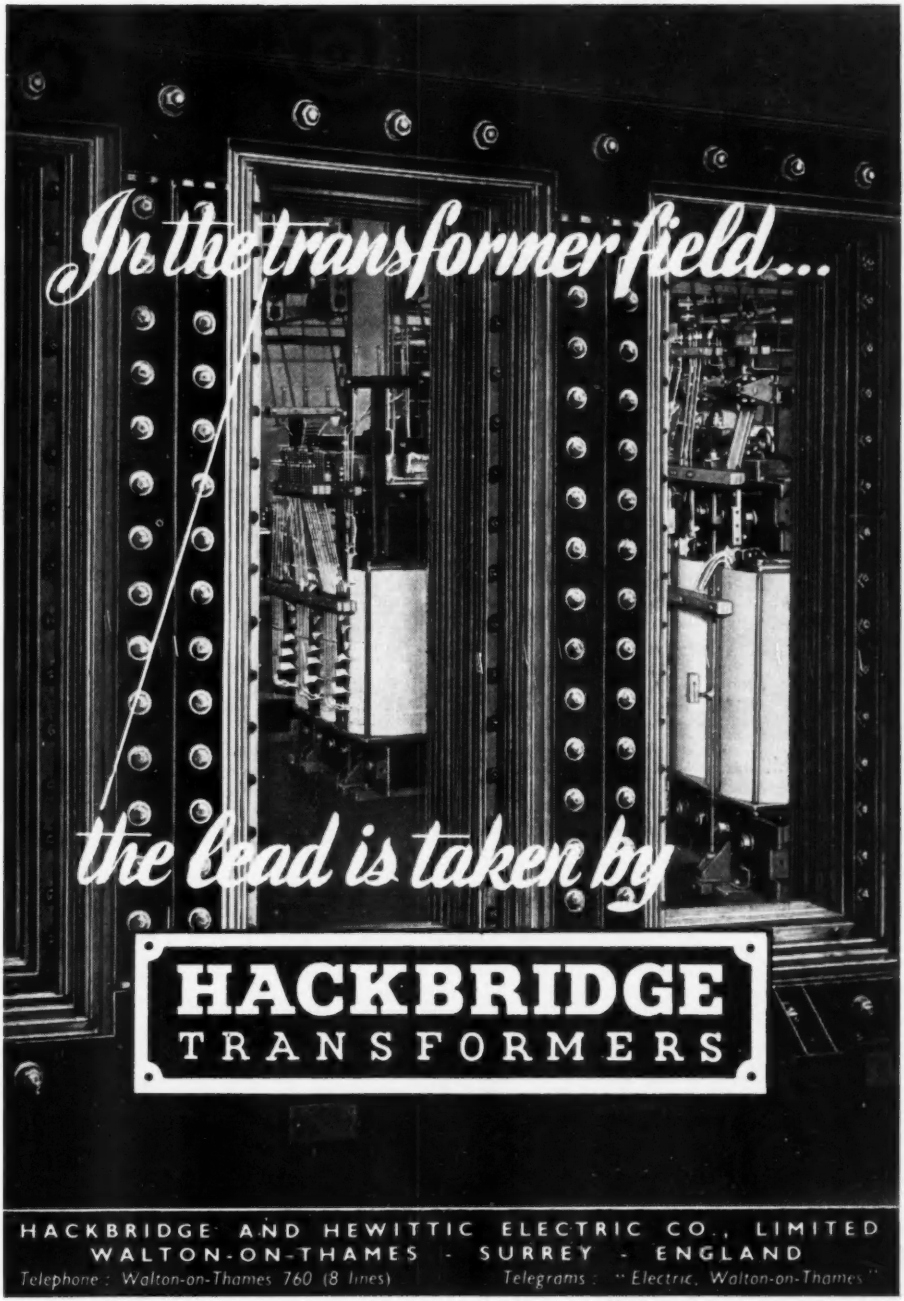
TUESDAY, SEPT. 2

ELECTRONICS SYMPOSIUM AND EXHIBITION organised by Scientific Instrument Manufacturers' Assoc. opens at Examination Hall, Queen Sq., London W.C.1, and continues until Sept. 5.

INCORP. PLANT ENGRS. (London).—"Care and Maintenance of Lifts." J. H. H. Weeks. Royal Soc. of Arts, 7 p.m.

WEDNESDAY, SEPT. 3

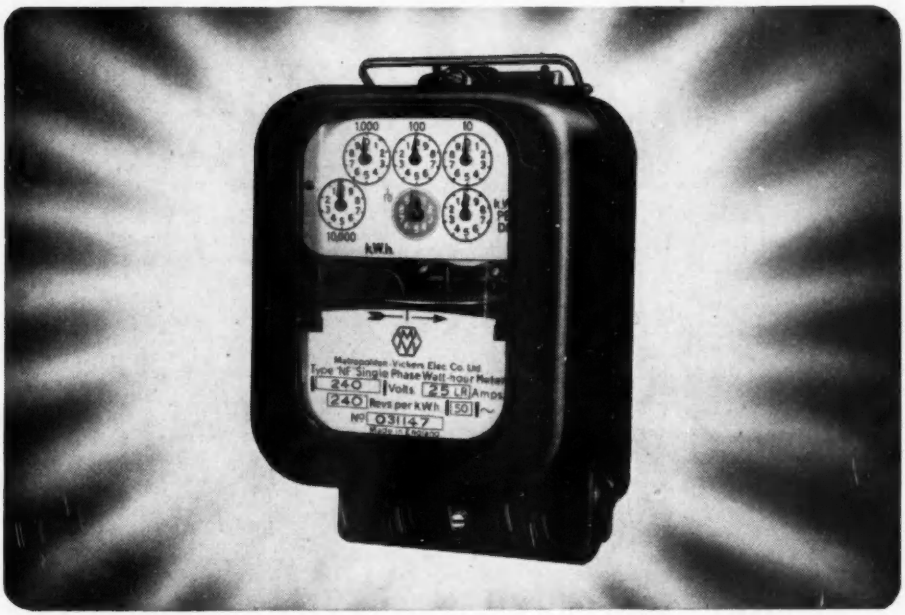
INCORP. PLANT ENGRS. (Southampton branch).—"Modern Lubrication Practice." R. S. Bassett. Polygon Hotel, 7.30 p.m.



HACKBRIDGE AND HEWITTIC ELECTRIC CO., LIMITED
WALTON-ON-THAMES - SURREY - ENGLAND
Telephone : Walton-on-Thames 760 (8 lines) *Telegrams : "Electric, Walton-on-Thames"*

Meticulous Metering

by the METROVICK TYPE NF Watt-hour Meter



SOME NOTABLE FEATURES

- Straight-line accuracy over a wide range of load.
- Complete temperature compensation.
- High accuracy over wide range of voltage.
- Damping system giving complete stability.
- Simple and accessible adjustments for calibration.
- Resilient lower (jewel) bearing.
- One terminal block for all capacities.

METROPOLITAN-VICKERS ELECTRICAL CO. LTD.
TRAFFORD PARK, MANCHESTER 17
Member of the A.E.I. group of companies

METROVICK *Meters, instruments and relays*

G/A905

CLASSIFIED ADVERTISEMENTS

OFFICIAL TENDERS AND APPOINTMENTS

WANTED • FOR SALE WORK WANTED

Those wishing to advertise in these pages should send the text to the Classified Advertisement Dept., Electrical Times, Sardinia House, Sardinia Street, London W.C.2, before 10 a.m. on TUESDAY of week of issue. Official Displayed Advertisements are charged at 42s. per inch, and all other classified advertisements at 3s. per line. Situations Wanted will be published four times for twice the single insertion rate. Fee for Box No. and postage on replies is 2s.

TENDERS INVITED

BOROUGH OF DOVER

TRUNK ROAD LIGHTING. SNARGATE STREET—A.2

TENDERS are invited for the installation of a lighting scheme to Group A Standard. The works include the supply and erection of 11 No. reinforced concrete columns, the fixing only of H.P.M.V. units and auxiliary equipment, and the complete wiring for same.

Plans and General Conditions of Contract may be inspected on application to the Borough Engineer, Brook House, Dover, and Specification and Form of Tender may be obtained from him upon payment of a deposit of £2 2s. returnable on receipt of a bona fide tender not subsequently withdrawn.

Tenders, in the envelopes supplied, must be returned to the undersigned not later than September 9, 1952.

JAMES A. JOHNSON,
Town Clerk.

New Bridge House,
Dover.
August 16, 1952. (A 665)

BOROUGH OF DOVER

TRUNK ROAD LIGHTING. SNARGATE STREET—A.2

TENDERS are invited from experienced firms for the supply and delivery of 11 sets of lanterns, with 400 watt H.P.M.V. lamps, gear, time switches, etc., all to Group A Lighting Standard.

Plans and General Conditions of Contract may be inspected on application to the Borough Engineer, Brook House, Dover, and Specification and Form of Tender may be obtained from him upon payment of a deposit of £2 2s. returnable on receipt of a bona fide tender not subsequently withdrawn.

Tenders, in the envelopes supplied, must be returned to the undersigned not later than September 9, 1952.

JAMES A. JOHNSON,
Town Clerk.

New Bridge House,
Dover.
August 16, 1952. (A 666)

WYMONDHAM URBAN DISTRICT COUNCIL

PROVISION OF STREET LIGHTING

TENDERS are invited for the supply, erection and installation of 21 pre-cast concrete columns, lanterns and auxiliary equipment on the London-Norwich Road, Wymondham, and for the conversion of existing gas lamps to electricity on other roads within the Urban District.

Specification and tender documents may be obtained from the undersigned on payment of a deposit of £2 2s. which will be returned on receipt of a bona fide tender.

Tenders, enclosed in a plain sealed envelope endorsed "Street Lighting," must be delivered to the undersigned not later than Monday, September 8, 1952.

The Council does not bind itself to accept the lowest or any tender.

T. J. TURNER,
Clerk.

Council Offices,
Wymondham,
Norfolk. (A 667)

COUNTY BOROUGH OF WALLASEY

LOCK-UP SHOPS to let on new housing estates. Tenders invited for 14 years lease with 7-year break clause in favour of tenant. Other shops in groups prohibited from competitive business. Further particulars and forms of tender from Housing Manager, 150 Brighton Street, Wallasey.

A. G. HARRISON,
Town Clerk.
(A 643)

UGANDA ELECTRICITY BOARD

30 MVA 132/33 kV TRANSFORMERS

TENDERS are invited for the SUPPLY, DELIVERY, ERECTION and SETTING TO WORK of eight single-phase 10 MVA Transformer Units, each with on-load tap-changing gear to provide two three-phase 30 MVA transformer banks, each with one spare transformer unit, respectively at Owen Falls Power Station near Jinja and at Tororo in the Protectorate of Uganda, East Africa; also, two earthing transformers are required at the latter site.

Copies of the tender document may be obtained on application to the Uganda Electricity Board, 129 Grand Buildings, Trafalgar Square, London S.W.1. Applications should be accompanied by a cheque for £2 2s. (returnable). The Board do not bind themselves to accept the lowest or any tender.

C. R. WESTLAKE,
Chairman.

P.O. Box 559,
Kampala, Uganda. (A 571)

APPOINTMENTS VACANT

Engagement of persons must be made through a Local Labour Office or Scheduled Employment Agency, if the applicant is a man aged 18-64, or a woman aged 18-59; unless the person concerned is excepted or the employment is in a managerial or professional capacity, or is otherwise excepted from the provisions of the Notification of Vacancies Order, 1952.

RHOKANA CORPORATION LTD.

A POWER STATION SUPERINTENDENT is required by Rhokana Corporation Ltd. to take full charge of the operation and maintenance of a station in Northern Rhodesia having modern water-tube boilers and with turbo-alternators totalling 45,000 kW.

Applicants must have degree and/or A.M.I.E.E. or A.M.I.M.E. and be under 46 years of age.

Proved evidence of experience in full control of a modern steam power station will be required.

The basic salary will be £1,300 p.a. and to this will be added a cash bonus liable to fluctuation, but amounting at present rate to a further £780 per annum. In addition there is a fluctuating cost-of-living allowance at present about £10 per month.

There are pension and life assurance schemes.

A house at nominal rent will be immediately available to the successful candidate and the cost of the outward passages of himself and his family will be borne by the Corporation.

Applications, stating age, marital status, educational and professional qualifications, and giving full details of experience in chronological order, should be addressed to:—

Anglo-American Corporation of South Africa Ltd., 11 Old Jewry, London E.C.2. (A 582)

SOUTH WEST SCOTLAND ELECTRICITY BOARD

Clyde Sub-Area

GENERAL ASSISTANT DISTRICT ENGINEER required for the Johnstone District. Salary Scale Class "F," Grade 13, £446-£465 per annum. The post is superannuable. Applicants should possess a degree in Electrical Engineering or hold equivalent qualifications. Experience of both h.v. and l.v., o.h. and u.g. distribution systems, including switchgear would be an advantage.

Applications should be forwarded to the Manager, The South-West Scotland Electricity Board, Clyde Sub-Area, 206 St. Vincent Street, Glasgow C.2, within 14 days. (A 619)

BRITISH ELECTRICITY AUTHORITY

East Midlands Division

APPLICATIONS are invited from suitably qualified engineers for the following appointments:—

Vacancy No. 76/52.

ASSISTANT SHIFT CONTROL ENGINEER,
Freeman's Meadow Generating Station.

Applicants should have had operational experience in the control room of a modern Power Station, and should hold the Ordinary National Certificate in engineering.

Salary for the appointment will be in accordance with Class "H," Grade 14 (£479 to £496) per annum), of the National Joint Board Agreement.

Vacancy No. 74/52.

ASSISTANT SHIFT CHARGE ENGINEER,
North Wilford Generating Station.

Applicants who should preferably possess the Higher National Certificate, or its equivalent, should have had responsible experience in the operation of modern Power Station plant. Pulverised Fuel experience will be an advantage.

Salary for the appointment will be in accordance with Class "K," Grade 9 (£741 to £771) per annum) of the National Joint Board Agreement.

The above posts will be pensionable within the provisions of the British Electricity Authority and Area Boards Superannuation Scheme.

Applications should be submitted on the official form which may be obtained from the Divisional Establishments Officer, British Electricity Authority, Barker Gate, Nottingham, and should be returned to the undersigned not later than September 8, 1952.

L. F. JEFFREY,
Divisional Controller.

August 15, 1952 (A 655)

WELLINGTON CITY CORPORATION

New Zealand

TRAMWAYS AND ELECTRICITY DEPARTMENT
DEPUTY METER ENGINEER

APPLICATIONS are invited for the above appointment, candidates should be corporate, or graduate members of the Institution of Electrical Engineers with qualifications in electrical measurements and experience in the testing and repair of electricity meters and instruments, either with a manufacturer or with a supply authority.

Salary £815 to £873 per annum, superannuation fund. Age 30 to 40 years.

Further particulars and application forms may be obtained from the undersigned within 14 days from the date of this advertisement.

PREECE, CARDEW AND RIDER.
8-10 Queen Anne's Gate,
London S.W.1. (A 636)

BRITISH ELECTRICITY AUTHORITY

London Division

APPLICATIONS are invited for the following superannuable posts. Salary, including London Allowance, and conditions of service in accordance with N.J.B. Schedule "A."

DEPUTY STATION SUPERINTENDENT
(a) Fulham Generating Station
(b) Deptford East Generating Station.

Candidates should have received a sound technical practical training and had extensive experience in the operation and maintenance of a large generating plant. They must also possess good administrative, organising and managerial abilities and have experience of labour relations.

Salary (a) Class "L," Grade 3—£1,284 p.a.
(b) Class "H," Grade 3—£1,060 p.a.

ASSISTANT BOILER HOUSE SUPERINTENDENT
Battersea Generating Station.

Qualifications: sound engineering training, with technical qualifications to at least Higher National Certificate standard, followed by experience with large modern boiler plant, preferably including powdered fuel firing. Salary—Class "L," Grade 7—£946 1s. p.a.

FIRST ASSISTANT STATION CHEMIST
Grove Road and St. Marylebone Generating Stations.

Candidates should be experienced in the testing of fuels, oils and waters and preferably be familiar with power station chemistry and operation. Salary—Class "G," Grade 9—£652 1s. p.a.

ASSISTANT ENGINEER (Efficiency)
Bankside "A" and "B" Generating Stations.

To be generally responsible for efficiency of plant, including testing. Salary—Class "H," Grade 11—£616 7s. p.a.

Applications, stating age, qualifications and experience should be addressed to Divisional Secretary, B.E.A., London Division, Ergon House, Horseferry Road, S.W.1, within 14 days of this advertisement. (A 663)

MIDLANDS ELECTRICITY BOARD

APPLICATIONS are invited for the following superannuable posts:—

FIRST ASSISTANT DISTRICT ENGINEER
(Market Drayton), North Staffs Sub-Area

Experience necessary in all branches of distribution work including the operation and maintenance of h.v. and l.v. underground and overhead distribution systems. Experience in d.c./a.c. changeover an advantage. Technical qualifications desirable. Salary £605 to £639 p.a. (N.J.B. Class "B," Grade 5). Apply in writing within seven days, stating age, present position, salary and experience, to Mr. H. A. P. Caddell, Sub-Area Manager, Midlands Electricity Board, 31 Kingsway, Stoke-on-Trent.

FIRST ASSISTANT ENGINEER (Severn Vale),
Central Gloucestershire Sub-Area

Experience necessary in all branches of distribution work including the operation and maintenance of high and low voltage, underground and overhead distribution systems. Technical qualifications desirable. Salary £694 to £708 p.a. (N.J.B. Class "D," Grade 5). Apply, in writing, within 14 days, stating age, experience, present salary and position, to Mr. D. Holt, Sub-Area Manager, Midlands Electricity Board, 126 London Road, Gloucester.

ENGINEERING DRAUGHTSMAN (Sub-Area Engineer's Department), Birmingham and District Sub-Area.

Applicants should be proficient in the preparation of engineering drawings required for the construction and operation of transmission and distribution networks. Salary £413 to £547 p.a. (N.J.B. Schedule "D," Grade 6). Apply in writing within 14 days stating age, experience, salary and position to Emil Braathen, Sub-Area Manager, Midlands Electricity Board, 14 Dale End, Birmingham 4.

A. STEPHENS,
Secretary.
(A 658)

BRITISH ELECTRICITY AUTHORITY

South Western Division

ASSISTANT SHIFT CHARGE ENGINEER required at Hayle Generating Station.

Superannuation scheme. Salary N.J.B., Class "F," Grade 9, £587-£609.

Applicants should have good technical qualifications and a sound knowledge of the operation and maintenance of generating plant.

Apply by August 31, 1952, stating age, qualifications, experience, present appointment and salary, to R. C. Barrett, Divisional Secretary, 26 Oakfield Road, Bristol 8. (A 640)

BRITISH ELECTRICITY AUTHORITY

North Western Division

AMENDED ADVERTISEMENT

STATION SUPERINTENDENT required for the new Carrington Power Station, near Manchester (ultimate capacity 240 MW). Applicants must have had experience in the management of a large modern steam power station, preferably with large P.F. boilers. Appreciation of modern concepts of administration, financial control and employee relations, including welfare, training and joint consultation, is desirable. Salary £1,291 £1,351 (N.J.B. J.1).

Apply, quoting vacancy No. 765, to the Establishments Officer, British Electricity House, 825 Wilmslow Road, Manchester 20, before September 6. (A 638)

CITY COUNCIL OF SINGAPORE

Electricity Department

APPLICATIONS are invited from suitably experienced and qualified engineers for the following vacancies on the staff of the new Singapore power station. Posts are permanent establishment, appointment on three years' agreement in first instance.

Appointment	Minimum Age	Approx. initial total salary and allowances £ p.a.
CONTROL ENGINEERS	26	2,037
COMBUSTION ENGINEER	26	2,037
ASST. MAINTENANCE ENGINEER (Electrical)	25	1,874
BOILER HOUSE SHIFT ENGINEERS	24	1,618

Salaries payable in Malayan Dollars $1 = 2s. 4d. The above figures of initial total salary and allowances include the basic salary and current variable Expatriation and Cost of Living Allowances. The C.o.L.A. used for calculation is that applicable to a married man with one or more dependent children.

Applications in duplicate with full details of qualifications, experience and personal circumstances to Messrs. Peirce and Williams, 1, Victoria Street, London, S.W.1, as soon as possible. (A 659)

BRITISH ELECTRICITY AUTHORITY

THE following vacancies occur in the Generation (Plant Design) Sub-Branch at Operational Headquarters in London. Salaries not less than £1,500 p.a. inclusive.

1. ENGINEER in charge of General and Co-ordination Section with an Honours Degree in Engineering or equivalent, and wide experience of large power station plant practice. Duties will include leadership of engineers charged with technical and economic aspects of the common services, general ancillary and material handling equipment, and the preparation of reports dealing with the general work of the Sub-Branch. Quote Ref. AE/279.

2. ENGINEER in charge of Boiler Section, with qualifications not below A.M.I.Mech.E. standard and a wide knowledge of boiler plant design for large power stations. Duties similar to above but concerned with technical and economic aspects of boiler plant and ancillary equipment. Quote Ref. AE/280.

Applications, which will be acknowledged, should be made on forms obtainable from D. Moffat, Director of Establishments, British Electricity House, Great Portland Street, W.1, by September 8, 1952. (A 627)

SOUTHERN ELECTRICITY BOARD

FIRST ASSISTANT ENGINEER
(MAINTENANCE AND OPERATION)

PORTSMOUTH District of No. 3 (Portsmouth) Sub-Area. Salary N.J.B., Class "F," Grade 5, Column 1 (£766 per annum). N.J.B. conditions of service.

Experience is required of the operation and maintenance of switchgear, transformers and cables up to and including 33 kV. The successful applicant will be required to assist the District Engineer with high and low voltage networks in this connection and deputise for him in his absence. The appointment will involve standby duties.

The successful candidate will be required to contribute to the B.E.A. and Area Boards' Superannuation Scheme, if eligible.

Applications on the standard form obtainable from the Sub-Area Secretary, Lower Drayton Lane, Cosham, Portsmouth, and returned to him in envelopes endorsed "Maintenance and Operation Engineer, Portsmouth," not later than September 2, 1952.

F. W. KEMPTON,
Secretary.

August 21, 1952. (A 644)

MERSEYSIDE AND NORTH WALES ELECTRICITY BOARD

REQUIRE SENIOR SERVICE CENTRE ASSISTANT at the Electricity Service Centre, Mostyn Broadway, Llandudno. Salary within range £440 to £500 p.a. (N.J.C. Grade 2) according to qualifications and experience. Applicants should have sound training in electrical retail trade and wide knowledge of modern electrical appliances for commercial and domestic use. Experience in an electricity undertaking and ability to speak Welsh would be added qualifications. Duties include supervision and control of Service Centre, display of apparatus and window dressing, hire purchase transactions and receipt of accounts payable at Service Centre. Appointment superannuable and subject to medical examination. Application forms from Manager, No. 4/5 Sub-Area, MANWEB, Electricity House, Rhostyllen, Nr. Wrexham. Closing date, September 10, 1952. (A 623)

BRITISH ELECTRICITY AUTHORITY

Midlands Division

GENERAL ASSISTANT ENGINEER required in the technical department. N.J.B. service conditions, superannuable appointment, salary in accordance with Schedule "C," Grade 8, commencing in the range £481 to £619 and ultimately rising to £674.

A university degree or Higher National Certificate in electrical engineering is required, together with experience in the electrical manufacturing or supply industry. Previous experience in power system planning will be an advantage.

Application forms available from the Establishments Officer, 53 Wake Green Road, Moseley, Birmingham, 13, to be returned by September 6, 1952.

F. W. LAWTON,
Divisional Controller.
(A 642)

BRITISH ELECTRICITY AUTHORITY

North Western Division

VACANCY No. 774. JUNIOR ENGINEER, Westwood Generating Station, Wigan. Commencing salary £375, rising to £471 (N.J.B. G.16/14). Shift duties in Control Room.

Apply, quoting vacancy No., to Establishments Officer, British Electricity House, 825 Wilmslow Road, Manchester 20, before August 30. (A 618)

BRITISH ELECTRICITY AUTHORITY

North Eastern Division

APPLICATIONS are invited for the appointment of ASSISTANT SHIFT CHARGE ENGINEER at Scarborough Power Station.

Applicants should have served a recognised engineering apprenticeship and should possess technical qualifications. Some experience in electricity generation would be an advantage.

The salary will be in accordance with the National Joint Board Schedule, Grade 9, Class "C" (£512 to £530 per annum).

Superannuation will be in accordance with the British Electricity Authority and Area Boards Superannuation Scheme.

Forms of application may be obtained from the Divisional Establishments Officer, British Electricity Authority, North Eastern Division, Carliol House, Newcastle-upon-Tyne, to whom they should be returned to arrive not later than August 30, 1952. (A 656)

YORKSHIRE ELECTRICITY BOARD

No. 7 (Grimsby) Sub-Area

APPLICATIONS are invited for the following appointment:

SALES REPRESENTATIVE
(Scunthorpe District) (Vacancy No. 7/14/52)

Applicants should have practical experience in negotiating with both urban and rural consumers in respect of new supplies and sales of domestic and agricultural equipment; should be competent to advise consumers on all types of domestic and agricultural installations, and to prepare estimates in this connection.

Salary, N.J.C., Grade 1, £360-£20-£440-£10-£450 per annum.

Applications, stating the above vacancy number, and giving full details of age, qualifications and experience should be forwarded to the Manager, No. 7 (Grimsby) Sub-Area, Yorkshire Electricity Board, Moss Road, Grimsby, not later than September 4, 1952. (A 635)

BRITISH ELECTRICITY AUTHORITY

South Wales Division

APPLICATIONS are invited for the superannuable appointment of JUNIOR ENGINEER (Crack Detection) in the Generation (Operations) Department at Headquarters at a salary in accordance with "AX/CX" 9 of the N.J.B. Agreement, £375 to £536 per annum.

Applicants should possess the H.N.C. or equivalent and preferably have metallurgical experience. The duties will include supersonic examination of boilers and turbines.

Forms of application obtainable from Divisional Secretary, at the address below, should be returned by September 4, 1952.

H. J. BENNETT,
Divisional Controller.

British Electricity Authority,
Cardiff (Pengam Moors) Airport,
Cardiff.

August 12, 1952. (A 625)

BRITISH ELECTRICITY AUTHORITY

South Western Division

GENERAL ASSISTANT ENGINEER required in the Technical Department, Bristol.

Superannuation scheme. Salary, N.J.B. Class "AX/CX," Grade 8, £481 to £655.

Applicants should possess technical qualifications leading to Associate Membership of the I.E.E., and have had works experience with electrical equipment manufacturers.

Duties will include commissioning and maintenance of protective and control equipment at generating and transmission stations.

Interest in design, testing and fault current calculations essential.

Apply by August 30, 1952, stating age, qualifications, experience, present appointment and salary, to R. C. Barrett, Divisional Secretary, 26 Oakfield Road, Bristol 8. (A 624)

BRITISH ELECTRICITY AUTHORITY

South Eastern Division

SHIFT CHARGE ENGINEER, Littlebrook Power Station. Applicants should have had suitable technical training and extensive experience in the operation of modern high-pressure turbine and boiler plant, e.h.t. switchgear and in the administration and control of labour. Preference will be given to those with P.F. experience. N.J.B. conditions, Class "J," Grade 7, £831 12s. p.a., including London Allowance.

Applications on forms obtainable from Station Superintendent, Littlebrook Power Station, Dartford, Kent, should be received by him not later than September 2, 1952. (A 620)

BRITISH ELECTRICITY AUTHORITY

REQUIRE THIRD ASSISTANT ENGINEERS in the following sections of the Generation Construction Branch at Headquarters, London. Qualifications not below Grad.I.E.E., or I.Mech.E. standard. Salaries, N.J.B. Grade 4, £732 to £954 including London Allowance.

1. Co-ordination Section—to assist in the co-ordination of construction work at a group of power stations. Knowledge of modern construction is essential and experience of site work an advantage. Duties may include visits to sites. Quote reference AE/283.

2. London Regional Office—with recent works experience of production methods, test and inspection of power station plant. Some experience of construction and erection work and attendance at site meetings would be an advantage. Quote Ref. AE/284.

Applications, which will be acknowledged, to D. Moffat, Director of Establishments, British Electricity House, Gt. Portland Street, W.1, by September 8, 1952. (A 626)

SOUTH WALES ELECTRICITY BOARD

REQUIRED in the Commercial Department of the Head Office of the Board at St. Mellons.

(a) SENIOR ASSISTANT to the Section Head (Low Voltage and Rural Development, Installations and Public Lighting).

(b) SENIOR ASSISTANT to the Section Head (Industrial Development).

Salaries for the positions will be in accordance with Class "AX/CX," Grade 1 (£945 to £1,141) of the N.J.B. Schedule.

Applications stating age, present position and salary, qualifications and experience, and giving three referees, to be addressed to the Secretary to arrive by Aug. 30, 1952.

D. G. DODDS,
Secretary.

St. Mellons,
Cardiff. (A 662)

LONDON ELECTRICITY BOARD

SENIOR ASSISTANT, SUB-AREA COMMERCIAL DEPT.

APPLICATIONS are invited for the above position in the Northern Sub-Area at Aldersgate, E.C.1.

Applicants should have had experience in the commercial development of electricity supply including electrical contracting activities and consumers' service sections and the administration of consumer service offices.

The post is graded within the National Joint Council agreement (Administrative and Clerical Grades) as Grade 4, i.e. £560 to £620 per annum, plus the appropriate London Allowance.

Application forms obtainable from Establishments Officer, 46 New Broad Street, E.C.2, to be returned by Aug. 30, 1952. Please enclose addressed foolscap envelope and quote reference V/1397/T on all correspondence. (A 661)

NORTH WESTERN ELECTRICITY BOARD

Sub-Area Technical Engineer's Department, Preston

THIRD ASSISTANT ENGINEER (SYSTEM PLANNING)

APPLICANTS should be experienced in planning and estimating for extensions of h.v. and m.v. networks, sub-station design and network calculations, and should possess some knowledge of protective equipment. Preference given to holders of a degree or H.N.C. in electrical engineering.

Salary scale: £699-£728 p.a., Grade K.10. N.J.B. conditions.

Applications to Sub-Area Manager, No. 4 Sub-Area, The North Western Electricity Board, 40-41 Lune Street, Preston, by August 30, 1952. (A 641)

BRITISH ELECTRICITY AUTHORITY

Southern Division

INVITE applications for a vacancy in the Administration Section of the Divisional Secretary's department. Preference will be given to those with knowledge of and experience in contract and insurance work. Salary N.J.C., Grade 3, £500 to £560. Application forms, obtainable from P. D. A. Oliver, Esq., Divisional Secretary, 111 High Street, Portsmouth, should be returned by Wednesday, September 3, 1952. (A 664)

BRITISH ELECTRICITY AUTHORITY

North Western Division

VACANCY No. 775, STATION SHIFT CONTROL ENGINEER, Accrington Generating Station. Salary £511/£527 (N.J.B. D.10).

Vacancy No. 776, OPERATION ENGINEER, Burnley Generating Station. Salary £655/£680 (N.J.B. C.5).

Apply, quoting vacancy number, to Establishments Officer, British Electricity House, 825 Wilmslow Road, Manchester 20, before August 30. (A 637)

BRITISH ELECTRICITY AUTHORITY

South West Scotland Division

STAFF VACANCY NOTICE

APPLICATIONS are invited for the position of MAINTENANCE ENGINEER (Mechanical) at Clyde's Mill Power Station.

Experience in high pressure boilers and turbines is essential. The salary will be in accordance with Grade 6, Class "J" of Schedule "A" of the National Joint Board Agreement.

Applications, stating age, technical attainments and experience, should be forwarded on Form A.E. 6 to the Divisional Secretary, British Electricity House, 168 Broomhill Drive, Glasgow, W.1, within 10 days.

A. CHRISTIANSON,
Divisional Secretary.

August 11, 1952. (A 639)

MERSEYSIDE AND NORTH WALES ELECTRICITY BOARD

FIRST ASSISTANT DISTRICT COMMERCIAL OFFICER required in the Wallasey District of the Board. Salary £715 to £749 p.a. (N.J.B. Class "E," Grade 5).

Applicants should have had sound technical training, and be able to deal with consumers' enquiries, supervise the Sales, Service and Contracting Sections (including estimating) and other general work of a commercial nature. Preference given to applicants who have the necessary qualifications to enable them to become Chartered Electrical Engineers.

Appointment superannuable and subject to medical examination.

Application forms obtainable from the Manager, No. 3 Sub-Area, MANWEB, Electricity House, Newgate Street, Chester. Closing date September 2. (A 657)

LONDON ELECTRICITY BOARD

ENGINEERING DRAUGHTSMEN

APPLICATIONS are invited for the above positions in the North Western Sub-Area Drawing Offices at Ayerook Street, W.1, and Willesden, N.W.2.

The duties include the preparation of layout drawings of transformer chambers, distribution systems not exceeding 11 kV and plans of existing systems, etc.

The posts are graded under Schedule "D" of the National Joint Board agreement as Grade 6, £438 to £574 7s. per annum inclusive of London allowance, and the commencing salary will be dependent upon qualifications and experience.

Application forms obtainable from Establishments Officer, 46 New Broad Street, E.C.2, to be returned by September 1, 1952. Please enclose addressed foolscap envelope and quote ref. V/1494/T on all correspondence. (A 669)

SOUTH EASTERN ELECTRICITY BOARD

Dover District

ASSISTANT ENGINEER

SALARY £541-£557 p.a. under N.J.B. Schedule, Class "D," Grade 9. Superannuable. Applicants should be qualified and have experience in the maintenance and operation of three and single phase e.h.t., h.t. and l.t. overhead systems and indoor and outdoor substations.

Applications, giving two referees, must reach R. G. Widgery, A.M.I.E.E., District Manager, SEEBoard, Ladywell, Dover, through an employment exchange, by September 3, 1952.

A. L. BURNELL,
Secretary.

August, 1952. (A 660)

BRITISH ELECTRICITY AUTHORITY

South West Scotland Division

APPLICATIONS are invited for the position of ASSISTANT SECTION ENGINEER in the Transmission Department, South West Scotland Division—in the West Section of the South West Scotland Division with Headquarters at Kilmarnock.

Applicants should have received a first-class technical education and should be preferably Corporate or Graduate Members of the I.E.E. or have qualifications for such.

Experience in the maintenance and operation of high voltage overhead lines and outdoor transformers and switching stations is essential and experience of 132 kV equipment would be an advantage.

Commencing salary will be within Grade 6, Class "AX/CX" of Schedule "C" of the National Joint Boards' Agreement.

Applications on Form AE6 should be forwarded to the Divisional Secretary at the above address within 10 days. (A 668)

BOX No. replies to be addressed to the ELECTRICAL TIMES, Sardinia House, Sardinia Street, London W.C.2

BRITISH ELECTRICITY AUTHORITY

Merseyside and North Wales Division

GENERAL ASSISTANT ENGINEER required for Transmission Department, Divisional Headquarters. Salary £481-£619 per annum, N.J.B. terms and conditions. Superannuable.

Applicants should have had experience in the installation and maintenance of high voltage switchgear, overhead lines, cables and transformers. Preferably be corporate or graduate members of the Institution of Electrical Engineers or have equivalent qualifications.

Application forms from the Divisional Secretary, Beaconsfield Road, Woolton, Liverpool. Closing date, September 6, 1952.

W. A. GAILON,
Divisional Controller.
(A 670)

BRITISH ELECTRICITY AUTHORITY

South East Scotland Division

PORTOBELLO POWER STATION

ASSISTANT MAINTENANCE ENGINEER (Electrical) required for Portobello Power Station.

Training in electrical engineering up to Grad.I.E.E. standard is necessary, and a good knowledge of mechanical engineering in relation to control instruments is desirable. Principal duties will be the maintenance of automatic combustion control gear working on a combined pneumatic-electrical principle associated with modern high-pressure boiler plant. Salary £697-£726 (N.J.B. Class "H.8") with Pension Scheme.

Apply by August 26, 1952, to the Divisional Controller, British Electricity House, Portobello, Midlothian. (A 621)

A SENIOR ASSISTANT is required for the Southampton Depot of leading wholesalers covering the South Coast. Early promotion for ambitious man with extensive experience. Salary in region of £400 to £500 p.a., according to qualifications. Apolication in writing, giving age and full particulars of past and present employment.—Box No. 1949, Electrical Times. (A 632)

CABLE FOREMEN and SITE ENGINEERS experienced in working on Air Ministry sites required by Scottish Contractors with work in all areas of Scotland and England. Good wages, conditions and superannuation. Apply giving full particulars and salary required to Box No. 1951, Electrical Times. (A 645)

CABLE JOINTERS, Linesmen and Foremen Linesmen required by leading Scottish Electrical Contractors for work in all areas of the United Kingdom. Applicants must have good experience with voltages up to at least 11,000. Good wages, conditions and superannuation.—Apply Box No. 1941, Electrical Times. (A 614)

COPPERSMITH for interesting electrical construction work in development engineering department. Experience required of tube working and copper fabrication, first class experience of brazing essential. Good wages, working conditions and canteen facilities. — Apply: Personnel Dept., Garringtons Ltd., Bromsgrove. (A 652)

ESTIMATOR required with experience in preparing tenders for all classes of a.c. and d.c. electrical rotating machinery, switchgear, etc., and familiar with standard specifications. 5-day week. Pension scheme.—Applicants should state age. Full details of experience, salary expected to Personnel Manager, Lancashire Dynamo and Crypto (Mfg.), Ltd., Trafford Park, Manchester, 17. (A 673)

FOR INDIA

AN old-established and well-known Company in India representing several reputable English manufacturers requires an ELECTRICAL SALES ENGINEER normally for employment in Bombay or Calcutta or Madras. Age preferred 22 to 28. Applicant must hold degree in Electrical Engineering or equivalent from a U.K. University and have had two years' practical experience with an approved U.K. manufacturer. Preference given to man having training and experience with switchgear manufacturing and estimating. Three years' agreement and six months leave (with pay) from India if offered second agreement after termination. Initial kit allowance £75. First-class passages. Monthly salary for single man 1,100 rupees first year, 1,200 rupees second year, 1,300 rupees third year, plus local monthly allowance 250 rupees. Additional allowance if married. Mutual contributory Provident Fund. Application must give full details of education, qualification, training and experience, and will be treated confidentially.—Box No. 1943, Electrical Times. (A 615p)

Engagement of persons must be made through a Local Labour Office or Scheduled Employment Agency, if the applicant is a man aged 18-64, or a woman aged 18-59; unless the person concerned is excepted or the employment is in a managerial or professional capacity, or is otherwise excepted from the provisions of the Notification of Vacancies Order, 1952.

ELECTRICAL DRAUGHTSMAN required, for design of special aircraft electrical equipment.—Apply: Employment Manager, Vickers-Armstrongs, Ltd. (Aircraft Section), Weybridge, Surrey. (A 601)

ELECTRICAL EXPERIMENTAL ENGINEER required for light mechanical and electrical works in Southern England. Good knowledge of induction motors together with a practical experience of at least three years required. Age preferably 25 to 35 years. The products at present manufactured include induction motors up to 5 h.p. and small a.c./d.c. apparatus. Special consideration will be given to applicant who possesses drawing office experience, and who can carry out the development and design work of electrical equipment. Please state past experience and salary required.—Box No. 1945, Electrical Times. (A 622)

GENERAL MACHINIST for turning, milling and boring operations. Interesting work on prototype development of automatic machines, and small batch production. Good wages, working conditions and canteen facilities.—Apply: Personnel Dept., Garringtons Ltd., Bromsgrove. (A 651)

HANDLEY PAGE (Reading) LIMITED, The Aerodrome, Woodley, Reading, have a vacancy in their Design Office for a SENIOR ELECTRICAL DRAUGHTSMAN. They have an interesting project in hand and the post is progressive and offers good scope for advancement to the right man.—Please send full particulars to The Personnel Officer. (A 649)

JUNIOR TECHNICAL ASSISTANTS. Young men with Higher School Certificate or suitable candidates with School Certificate are required as junior technical assistants for carrying out general electrical and mechanical engineering development work. Facilities will be given for part-time technical study leading to engineering degree. Good working conditions and canteen facilities.—Apply: Personnel Dept., Garringtons Ltd., Bromsgrove. (A 653)

METER REPAIRER (MECHANICIAN) required in the Meter Testing Department of the British Electricity Authority (London Division) at 95 Park Street, Southwark. Must be experienced in overhead and repair of integrating meters, indicating instruments and relays. Preference given if able to carry out site maintenance on impulse summation and demand recording equipment. Manufacturer's works experience an additional advantage. Wages and conditions in accordance with N.J.I.C. Agreement for electricity supply industry. Present rate, 3s. 8½d. per hour for 44-hour, 5-day week.—Apply, Ministry of Labour and National Service, Walworth Road, S.E.17, quoting Vacancy No. 1827. (A 630)

REQUIRED for Middle East. PLUMBER JOINTER experienced in jointing paper insulated cables, lead covered and armoured, up to 11 kV.—Apply, stating age and experience. Forward copies of testimonials or state names to whom we may apply to Box No. 1911, Electrical Times. (A 511)

SALES AND ESTIMATING ENGINEER required for export department in Westminster covering electric motors and associated equipment. Excellent prospects for engineer with energy, initiative and knowledge of DMA/DMX.—Full details to F.H.S., Lancashire Dynamo and Crypto (Mfg.) Ltd., 94 Petty France, Westminster, S.W.1. (A 629)

SALES ENGINEER required by The Benjamin Electric Ltd., to operate the area covered by the South Wales Electricity Board for the sale of industrial and commercial lighting fittings. Applicants should have sales experience, preferably in South Wales, and knowledge of illuminating engineering.—Write, detailing education, experience, past and present employment, age, etc., and remuneration required, to the Area Manager, The Benjamin Electric Ltd., 5 Corporation Street, Birmingham 2. (A 628)

SALES ENGINEER, technically qualified, required by Birmingham office of leading electrical manufacturers for the counties of Warwickshire, Worcestershire, Leicestershire, Staffordshire, Northamptonshire and Shropshire. Applicants should own car, for which suitable allowance would be paid.—Full details to include age and salary required to Box No. 1953, Electrical Times. (A 646)

TRANSFORMER DRAUGHTSMAN, age 26/30 years, required for rectifier transformers. Should have sound drawing office experience.—Please reply, giving age, details of experience and salary required, to Nevelin Electric Co., Ltd., Purley Way, Croydon. (A 578)

TEMPLATE MAKER/PLATER for light constructions, fabricated machine frames and components. Applicants must be used to accurate working and preferably able to tackweld and effectively specify welding sequences. Good wages, working conditions and canteen facilities.—Apply: Personnel Dept., Garringtons Ltd., Bromsgrove. (A 650)

VACANCIES exist in Development Engineering section for one or two conscientious men to act as HANDYMEN/MATES. Applicants must have good record for willingness and cleanliness and preferably have some trade capabilities. Good wages, working conditions and canteen facilities.—Apply: Personnel Dept. Garringtons Ltd., Bromsgrove. (A 654)

WANTED, capable REPRESENTATIVE already calling on leading stores in Scotland, Midlands, East and South-east England and Wales. To introduce new type of light fitting, which is already well established in London. 10% commission. Own car essential.—Sterling Light Co., 50 Ledbury Road, London W.1. (A 672)

APPOINTMENTS WANTED

B.Sc.(ENG.), A.M.I.MECH.E., A.M.I.E.E., 39 years old; ex-B.T.H. student apprentice; 3 years captain R.E.M.E. India-Egypt; 8 years experience technical sales switchgear (h.t. and l.t.) transformers, rotating plant, control gear, instruments, etc., seeks responsible post, preferably in sales (but others considered) in London. Home Counties or South Wales areas. Extensively travelled abroad. Willing travel in Europe or America for inspections, negotiations, etc.—Box No. 1947, Electrical Times. (A 631)

70 ACCOUNTS opened in a year. Personable ex-R.A.F. S/Leader, Signals, seeks sound SALES APPOINTMENT. Single, car, mobile, located in London.—Box No. 1925, Electrical Times. (A 570)

WORK WANTED

A.C. and d.c. Motor Rewinds and Repairs. Prompt service, fully guaranteed. Edgware 5566 (4 lines). —Service Electric Co., Ltd., Stanmore, Middx. (A 19)

CASTINGS. Fisher Foundries, Ltd., Greet, Birmingham, have capacity for brass, gun metal and soft grey iron machine moulded repetition castings weighing 1-30 lb. Loose pattern work up to 3 cwt. Delivery by road to all parts. Tel.: B'ham, Victoria 0197. (A 647)

CONDENSER AND TRANSFORMER CASES. Special boxes and covers. Sheet metal and press-work for the electrical trade. May we quote you? A.I.D. approved.—Conway-Tolhurst Ltd., Airport, Cardiff. (A 613)

WELDING WORK WANTED. Large capacity available in all materials and methods. Keen prices and good workmanship. Difficult jobs our speciality. A.I.D. approved.—Conway-Tolhurst Ltd., Airport, Cardiff. (A 612)

WANTED

A.C.-D.C. MOTORS, STARTERS, complete change-over installations, etc.—A.A. Electrical Co., Ltd., 67 Rothschild Road, Chiswick Park, W.4. Tel.: Chiswick 5105. (A 11)

SURPLUS STEEL STOCKS wanted. Strips, bars, sheets, etc.—Details to Morleys (Birmingham), Ltd., Regina Works, Alcester Street, Birmingham 12. (A 203)

TO CONDUIT FITTING MANUFACTURERS. Large manufacturing, distributing house is interested in a small manufacturer of Conduit Fittings. Purchases paid for weekly, or might be interested in taking financial interest.—Box M.8465, The National Publicity Co., Ltd., 358 Strand, London W.C.2. (A 558)

£50,000

Immediate cash available for purchase of New Ball and Roller Bearings, all types. Steel Balls and Rollers. Top prices paid. Purchases from Traders only.

CLAUDE RYE BEARINGS

895-921 Fulham Road, London, S.W.6
RENown 6174 (20 lines) (A 328p)

WANTED, D.C. and A.C. ball-bearing MOTORS, MOTOR GENERATOR SETS, DYNAMOS and ALTERNATORS.—Full details to Britannia Manufacturing Co., Ltd., 22-26 Britannia Walk, London N.1. (A 7)

WANTED for prompt cash, ferrous and non-ferrous SCRAP; also plant for dismantling. Buyers of secondhand machinery and plant for re-use.—W. and H. Cooper, Ltd., 176 Brady Street, Bethnal Green, E.1. (A 1)

WANTED, ROTARY CONVERTORS, any size.—Universal, 221 City Road, London E.C.1. (A 9)

WANTED, Large quantity of 4-in. outside diameter TUBES from the dismantling of old Babcock Water-tube boilers. Best prices paid. Prepared to purchase Babcock and Wilcox Water-tube Boilers for dismantling. —Apply, giving full details, to Midland Iron and Hardware Co., Cradley Heath, Staffs. (A 3)

AGENCIES

INTRODUCTORY COMMISSIONS payable to firms or persons, on sales of brass, aluminium, copper rods, sheets and tubes, at competitive prices.—Box No. 1931, Electrical Times. (A 585)

FOR SALE

CABLES & WIRE

4,000 yards 0·06 four-core P.I.L.C.S.W.A. and S. 660 V. New C.M.A. Cable. Test certificates available.—A. and H. Evans, 65 Birkbeck Road, Ilford, Essex. (A 634)

GENERATING PLANT

FOR sale by public tender, pair of DIESEL-ALTERNATORS with Control panels and Synchroscope comprising the following:—

35 h.p. Tangye 5-cylinder water-cooled diesel engine, mounted on integral bedplate, and direct-coupled with a Crompton Parkinson 400 V 45 amp 31.25 kVA Cont. rated, 1,000 r.p.m. 0.8 P.F. 3-phase 50 cyc, generator and exciter. Polished slate panel for each set, with instruments and circuit breaker, also hinged auxiliary panel with voltmeters and synchroscope.

For appointment to inspect, ring Biggin Hill 247.

Tenders shall be submitted (in envelopes to be provided) so as to reach the Receiver for the M.P.D., New Scotland Yard, S.W.1, not later than noon on September 5, 1952. (A 648)

THESE machines can be seen and inspected on premises. 5 kVA petrol-driven Generating Sets, 230 V; 9 kVA petrol-driven Generating Sets, 230 V; 20 kVA diesel-driven Generating Sets; 25 kVA diesel-driven Generating Sets, 400 V; 30 kVA diesel-driven Generating Sets, 500/550 V; 50 kVA diesel-driven Generating Sets, 400 V.—For further information apply to Chamberlain Industries, Ltd., Argall Works, Leyton. Tel.: Leytonstone 6636. (A 603)

ENGINEERING PLANT & MATERIALS

WELDING EQUIPMENT. Four 10-kVA, 200/500 V, 50 cycles, Transformer Welding Equipment by Actarc, output 15/200 amps.

A.c./d.c. Motor Generator Welding Set by Quasi Arc/Laurence Scott, 480 V. d.c., output 20/80 V, 200 amps., ball bearings, with starter, voltmeter and ammeter, mounted on bogey.

Several 22/32 kVA Transformer Welding Sets, input 400 V, 50 cycle supply, double and single operator type, oil-immersed transformers, output 15/250 amps., max. range 500 amps, with regulators, mounted on bogeys.

200/440 V, 50 cycle supply, air-cooled Transformer Welding Set, by Metropolitan-Vickers, "Thermac" type, output 85/95 V, 300/450 amps., with regulator and ammeter.

Oil-immersed Transformer Welder by English Electric Co., 400 V, 50 cycles, input, output 5/300 amps. Also switch giving low, medium and high output. With regulator.

36 kVA Sciaky Spot Welder, 400 V, 50 cycle supply, watercooled electrodes, pneumatic operated head by foot switch, 18 in. throat, tapping switch giving short, medium and long welds, with Igranic timer.

250 amp. single operator petrol driven Welding Generator Set comprising Morris 4-cylinder engine, handstarting, complete with daily fuel tank, usual accessories for engine, direct coupled to 7·5 kW, 30 V, 250 amp. d.c. generator, ammeter, voltmeter. On fabricated chassis.

Petrol-driven Welding Set, comprising 6-cyl. engine, electric starting, direct coupled Welding Generator, 16/80 V, 625/312 amps., inbuilt exciter running at 1,500 r.p.m., complete with current regulator, voltmeter, ammeter.

George Cohen, Sons and Co., Ltd., Wood Lane, London W.12. (Tel.: Shepherds Bush 2070) and Stanningley, near Leeds (Tel.: Pudsey 2241). (A 616)

750,000

NEW BALL RACES, ROLLER, THRUST AND TIMKEN RACES IN STOCK. STOCK LISTS AVAILABLE.

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LIGHTING EQUIPMENT

PURLEY CHOKES AND BALLASTS. Our 80 W Tapped h.p.f. Ballast, with Starter Switchgear-holder incorporated, is proving itself the most popular unit. Suitable for most fittings. 57/6 each, subject.—F. W. Blanshard, Ltd. (Dept. ET), Purley, Surrey. Uplands 4818-9. (A 20)

METERS

A.C./D.C. QUARTERLY and SLOT METERS.—Brent Electrical Co., 6 Holmdale Gardens, N.W.4. (A 8)

HOUSE-SERVICE METERS, a.c. or d.c., quarterly or prepayment.—Universal Electrical, 221 City Road, London, E.C.1. (A 14)

METERS, a.c. and d.c., new and reconditioned, all types. Quarterly, single and 3-phase, 3- and 4-wire 2½ to 1,000 amp. Prepayment, single and double tariff, single, dual and triple coin, fixed and variable tariff, 2½ to 50 amp. M.D.I., Billiard Switches, Rent Collectors. Prices from 5/-, carriage paid. Guaranteed for ever. Immediate delivery.—Illustrated catalogue from the Electric Meter Company, Castor Road, Brixham. (A 170)

MOTORS & STARTERS

A.A. ELECTRICAL CO. FOR A.C.-D.C. MOTORS, SWITCHGEAR, EXHAUST FANS, HOISTS, REDUCTION GEARS, new, or reconditioned units.—Chiswick 5105, Chiswick 5605, 67 Rothschild Road, W.4. (A 10)

A.C. and D.C. MOTORS, all sizes, large stocks. Fully guaranteed.—Milo Engineering Works, Ltd., Milo Road, East Dulwich, S.E.22. (Forest Hill 2278-9). (A 5)

A.C. and D.C. MOTORS, GENERATORS, from stock.—Service Electric Co., Ltd., Honeypot Lane, Stanmore, Middx. Edgware 5566/9. (A 13)

A.C. and D.C. MOTORS, GENERATORS, SWITCHGEAR, etc., always in stock. Let me have your inquiries.—G. E. Whittaker, Wellington Mill, Bolton Road, Blackburn. Tel. 7322. (A 6)

CROMPTON PARKINSON MOTORS, 1/6 h.p. 1,230/50. New, £3 18s. 6d. Carriage 5s. 6d. B.T.H., ¼, 1,230/50, £5. Carriage 5s. 6d. 400 other motor bargains.—L. C. Northall, 16 Holly Road, Quinton, Birmingham 32. (A 633)

All types and sizes of

Industrial Electrical Equipment

ELECTROPOWER COMPANY LIMITED
Kingsbury Works, Kingsbury Road, London N.W.9.
Telephone: COLindale 4621/2. (A 18p)

FOR ELECTRICAL MOTORS, GENERATORS, ALTERNATORS, SWITCHGEAR, please send your inquiries to Oldfield Engineering Co., Ltd., 96 East Ordsall Lane, Salford 5. (A 16)

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MERCURY SWITCHES are made by Hall Drysdale and Co., Ltd., of 58 Commerce Road, Wood Green, London N.22. Tel.: Bow 7221. (A 15)

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TWO 1,000 kVA outdoor type TRANSFORMERS by Johnson and Phillips, new 1941, ratio 10,750/400 volts, 3 phase, 50 cycles, fitted with trifurcating boxes, off load tapping switch, etc. As new.

Two B.T.H. Draw out type H.T. SWITCHES, complete with meters, etc., for above, new 1941.

Two Crompton Parkinson L.T. Drop down type SWITCHES with meters, etc., for above, new 1941.

Two Crompton Parkinson 4-panel L.T. SWITCHBOARDS, 400/3/50, fitted with 600 amp. drop down type circuit breakers, meters, etc.

F. Burrill and Co., 109 Pencisely Road, Llandaff, Cardiff. Telephone: Llandaff 95. (A 617)

BUSINESSES FOR SALE

FOR SALE. Electric Bed Blanket manufacturing business (new design). Plant, machinery and some completed stock, £950. For removal or house and workshops available.—Box No. 1955, Electrical Times. (A 671)

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CITY AND GUILDS (Electrical, etc.) on "No pass-No Fee" terms. Over 95% successes. For full details of modern courses in all branches of Electrical Technology send for our 144-page handbook FREE and post free.—B.I.E.T. (Dept. 39), 17 Stratford Place, London W.1. (A 54)

FREE! Brochure giving details of courses in ELECTRICAL ENGINEERING and ELECTRONICS, covering A.M.Brit.I.R.E., City and Guilds, etc. Train with the Postal Training College operated by an Industrial Organisation. Moderate fees.—E.M.I. Institutes, Postal Division, Dept. ET.29, 43 Grove Park Road, London, W.4 (Associate of H.M.V.) (A 305)

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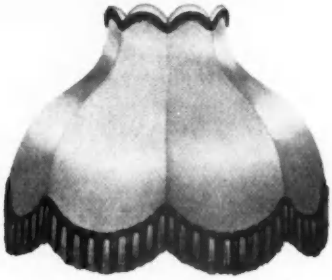

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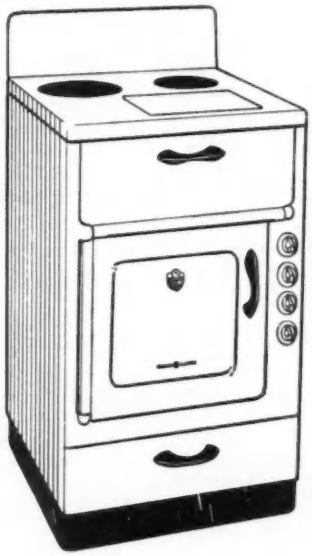

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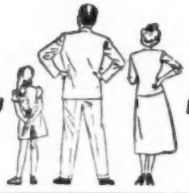

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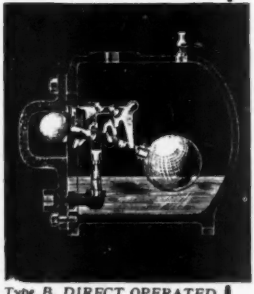

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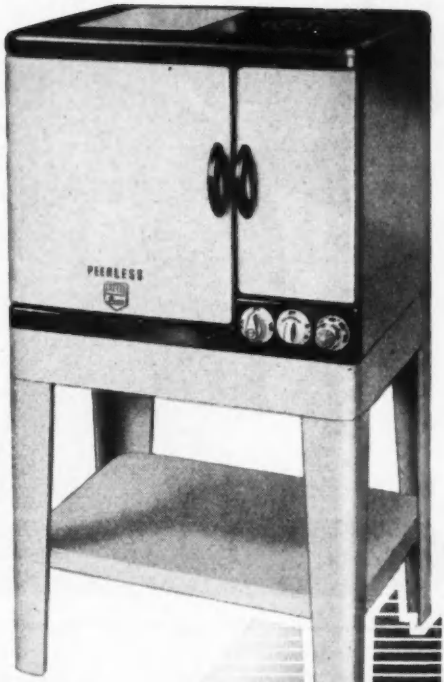

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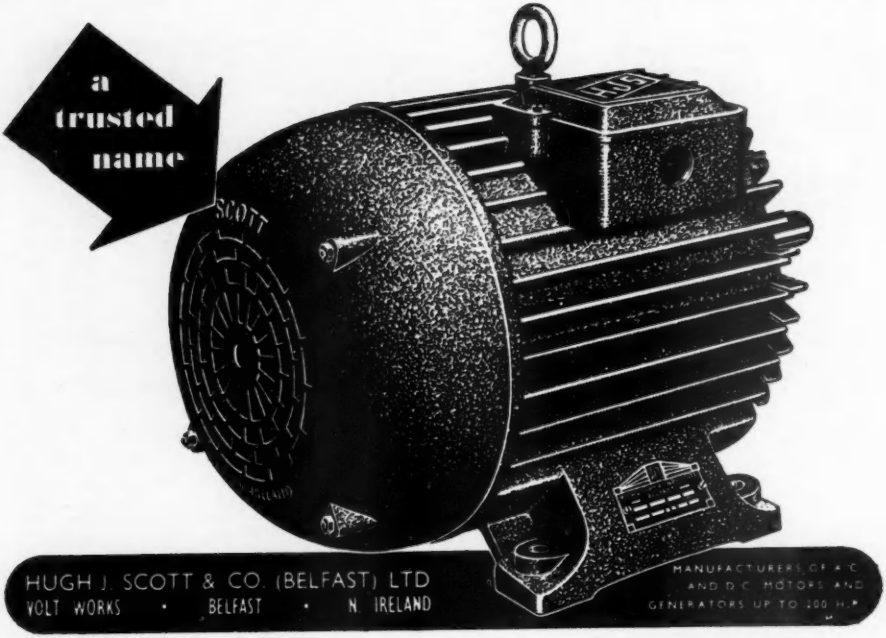
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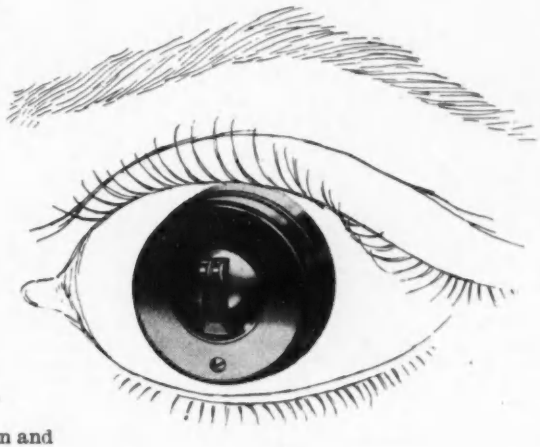

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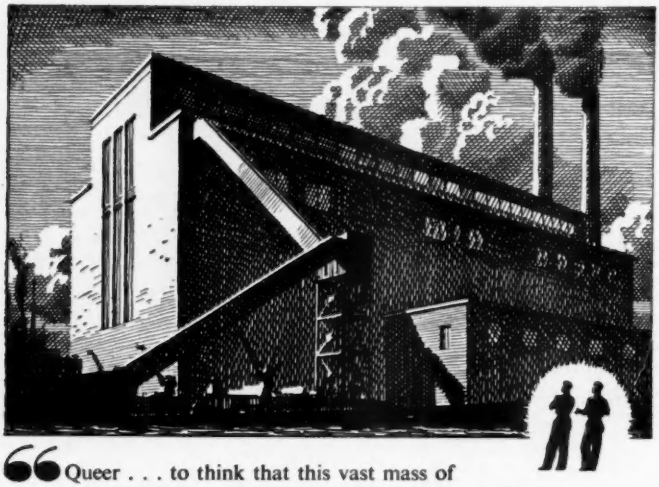

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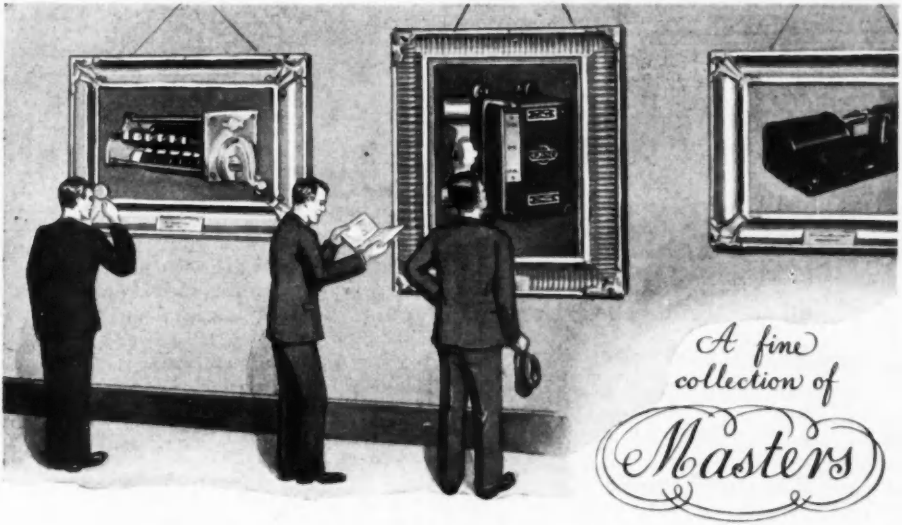

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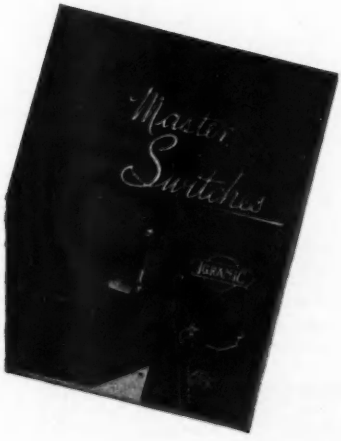

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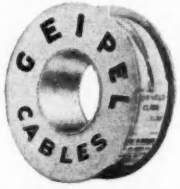

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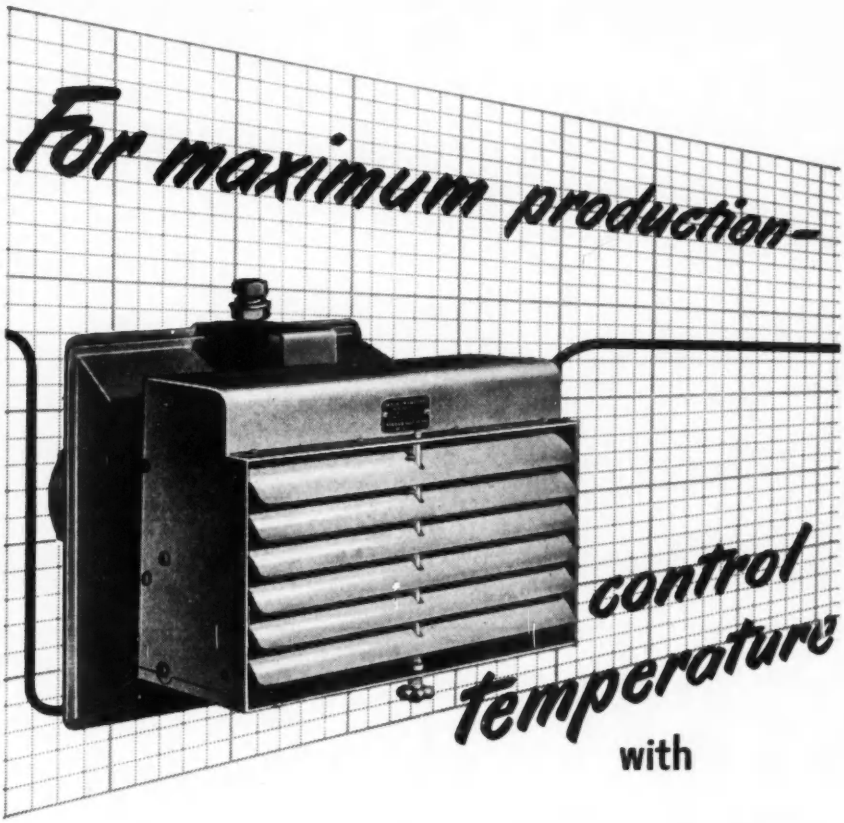

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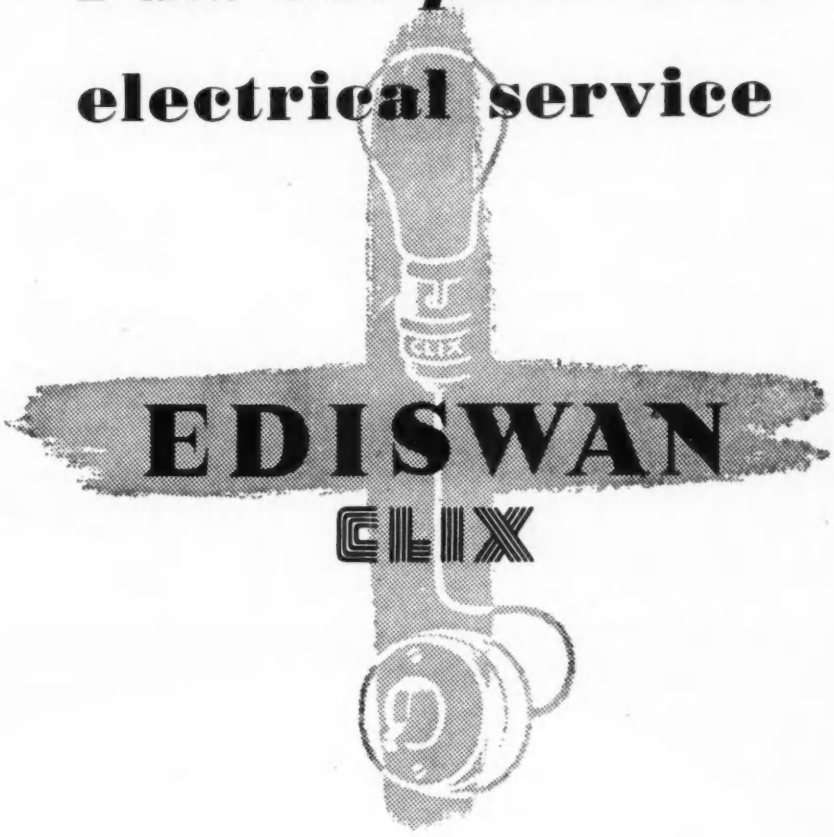

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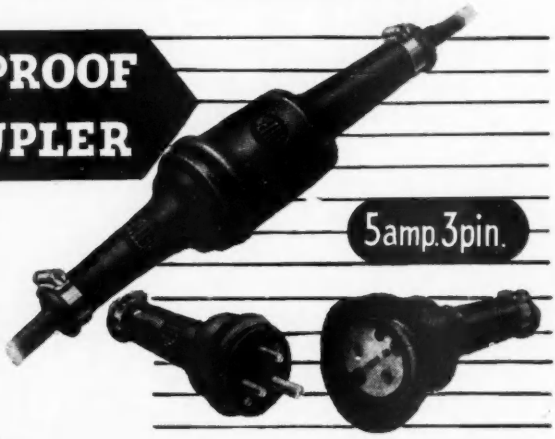

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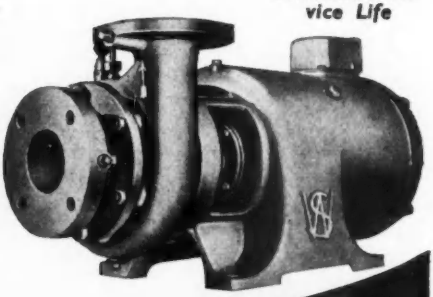

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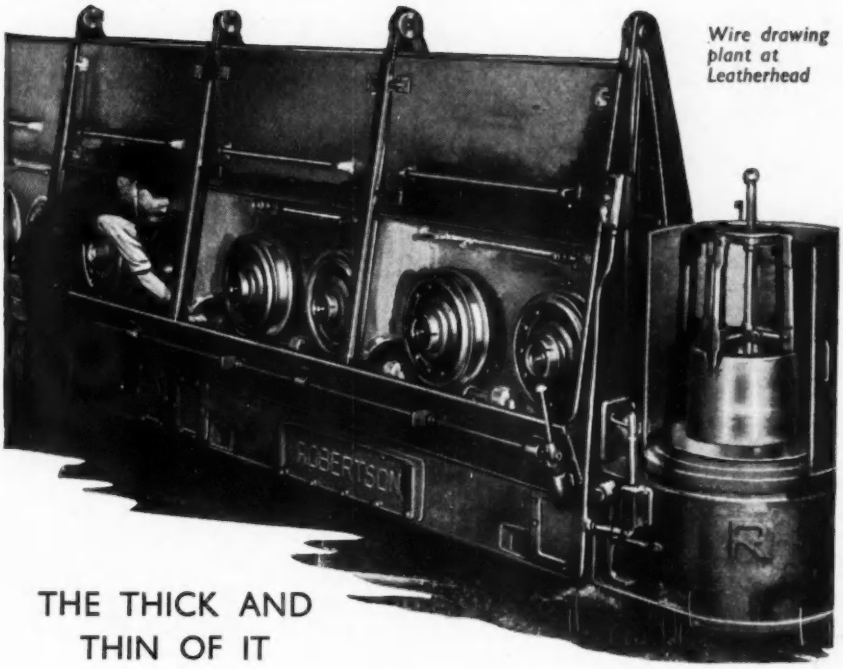

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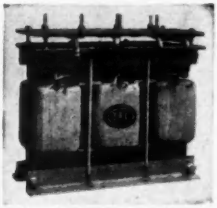

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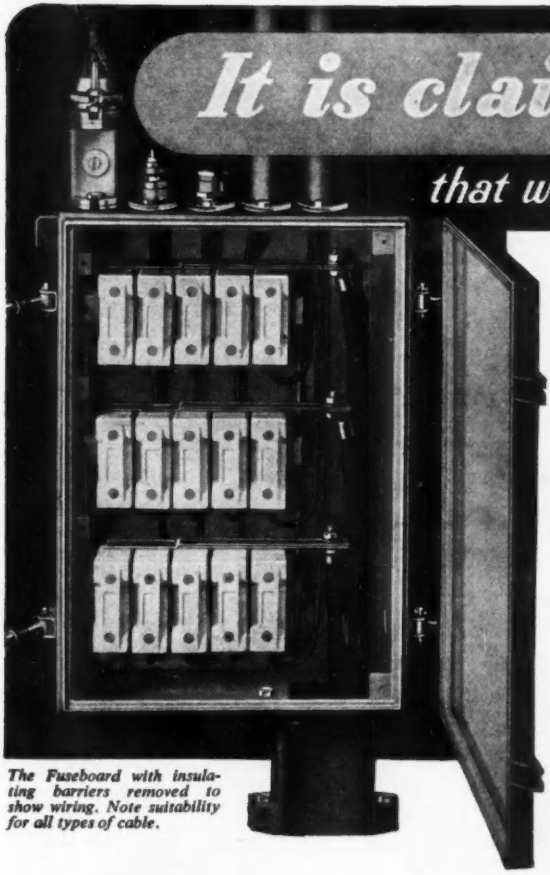

The Fuseboard with insulating barriers removed to show wiring. Note suitability for all types of cable.

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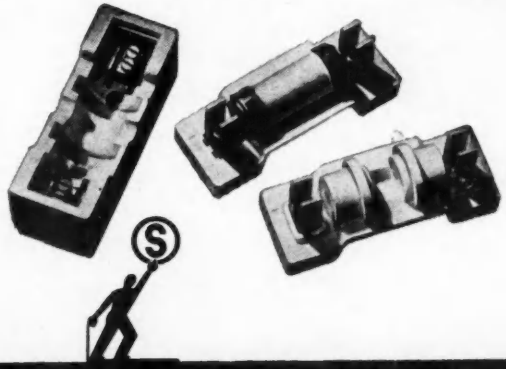

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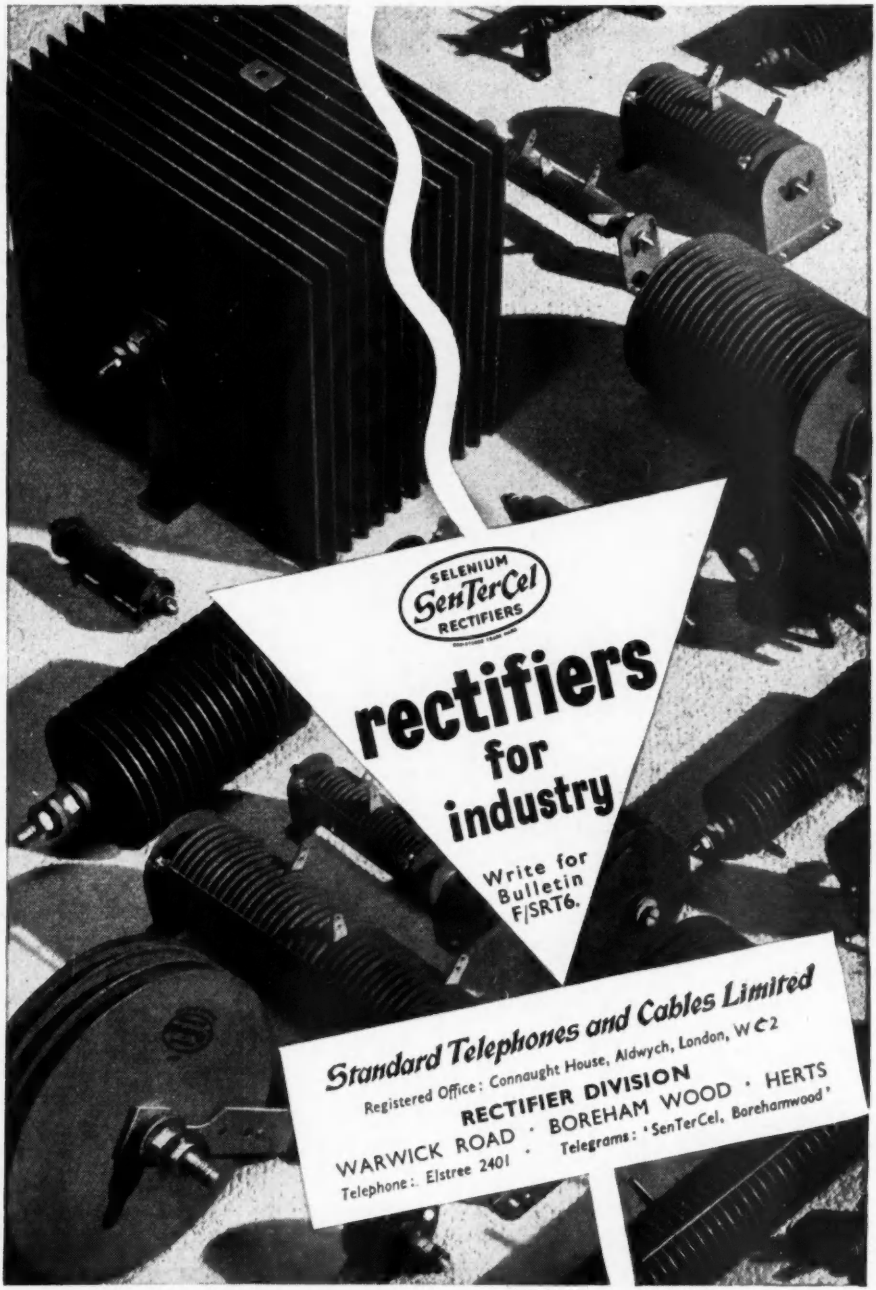

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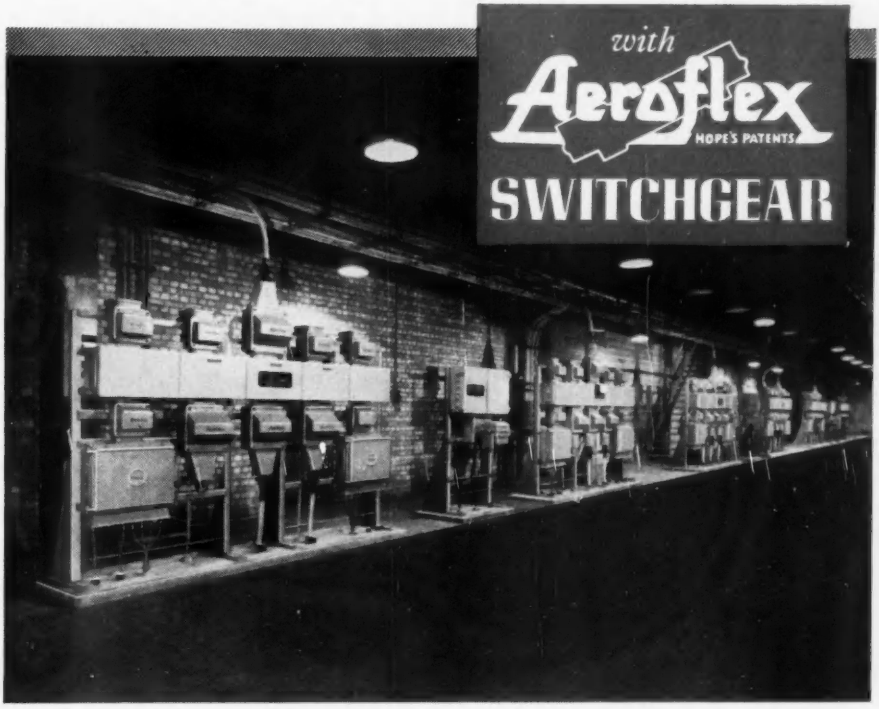

Unit type Switchboards, equipped with Aeroflex high breaking capacity rewireable cartridge fuses installed in the distribution board annexe of Walsall Generating Station

Photograph by courtesy of the British Electricity Authority.

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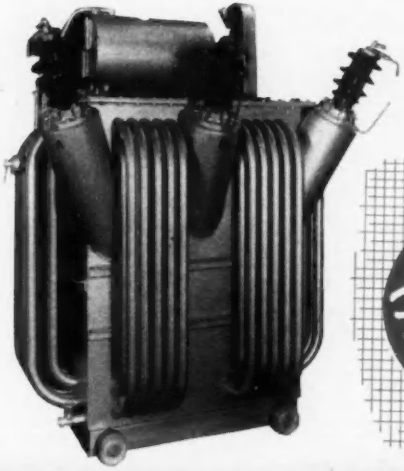

The illustration shows a 400 kVA 22kV transformer for service abroad

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